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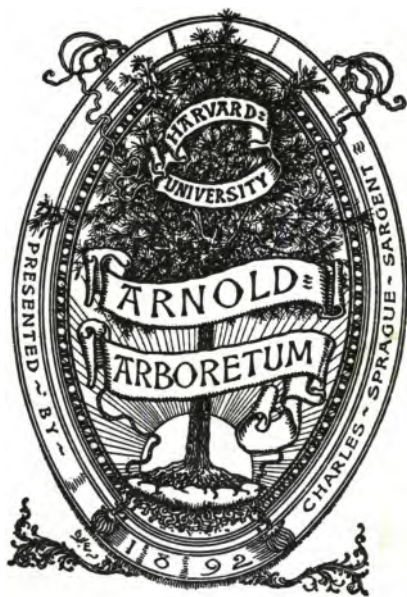
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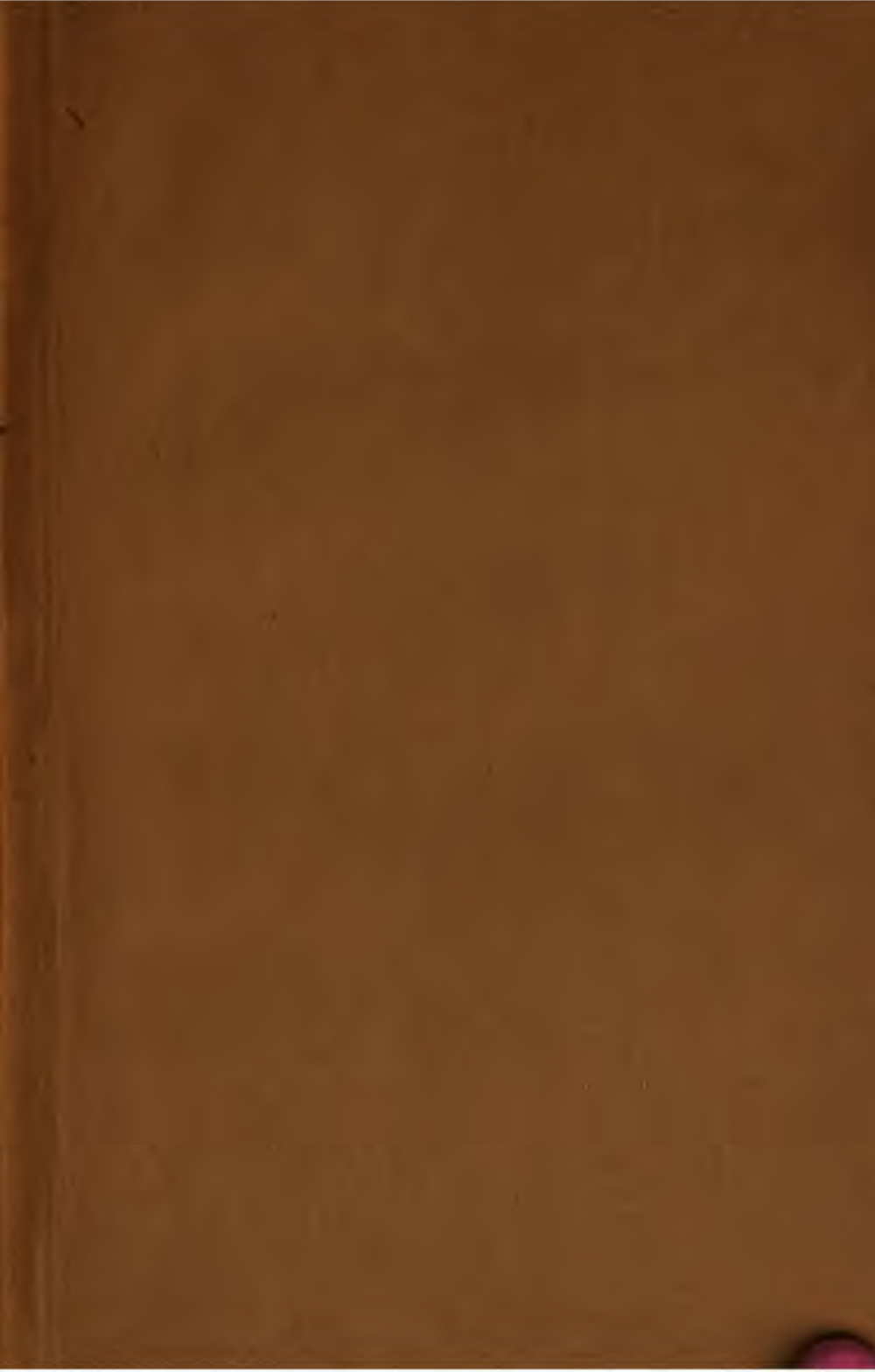
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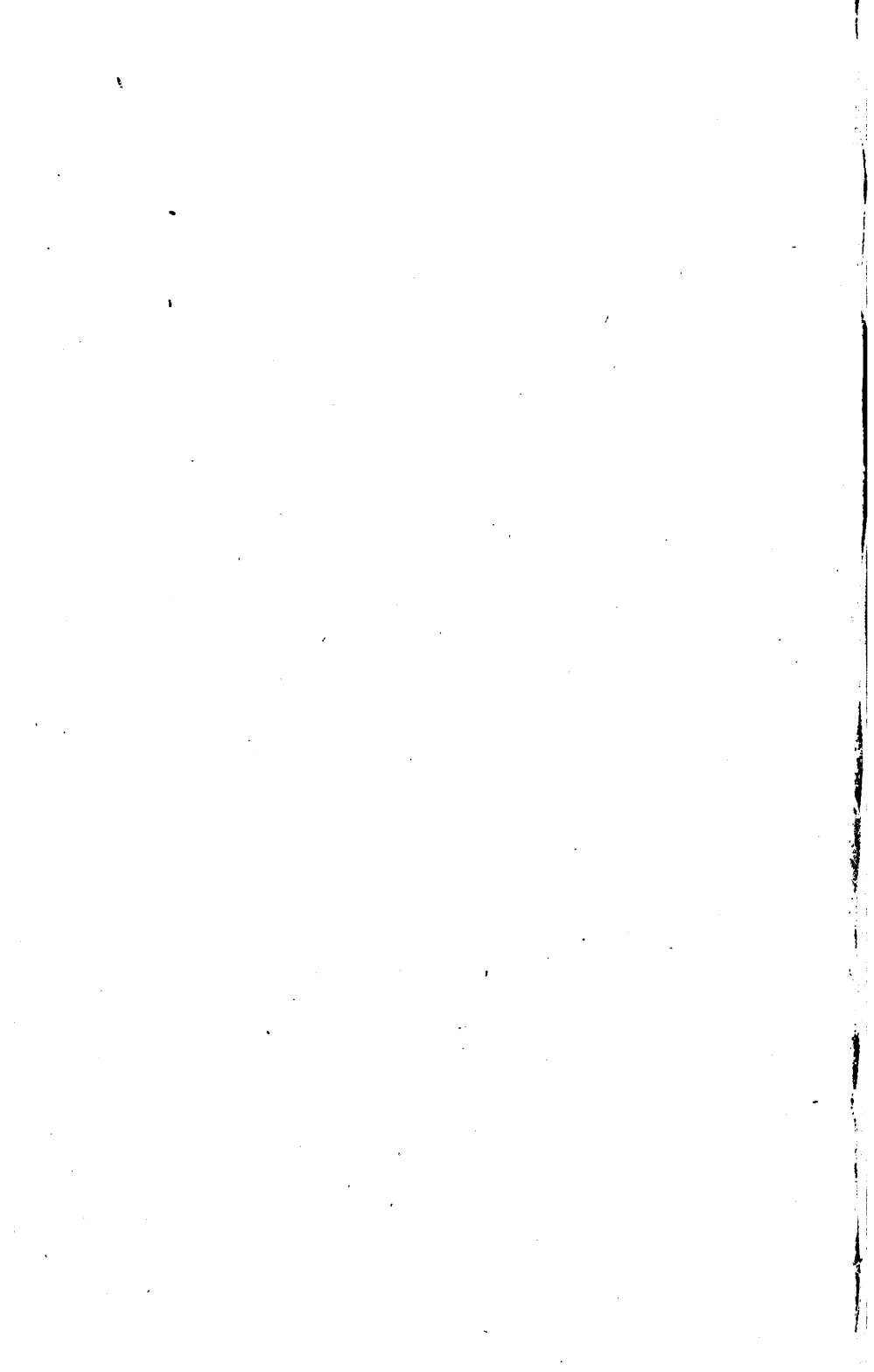
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Science and Art Department.

GUIDE

TO THE

ROYAL BOTANIC GARDENS, GLASNEVIN.

BY THE LATE
DAVID MOORE, PH.D.

REVISED AND ENLARGED BY
PROFESSOR W. R. McNAB, M.D., F.L.S.



B. J. Thorne

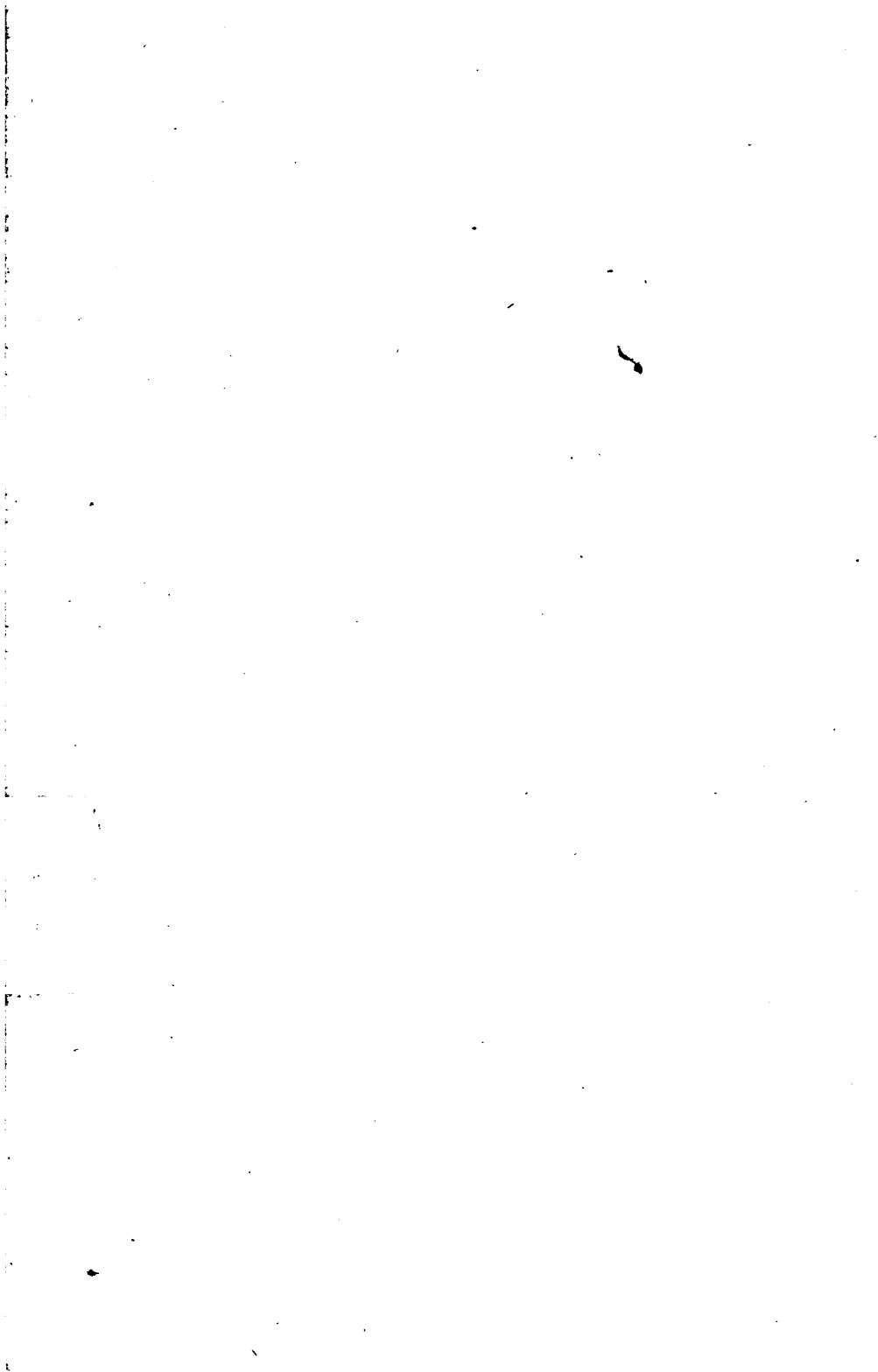
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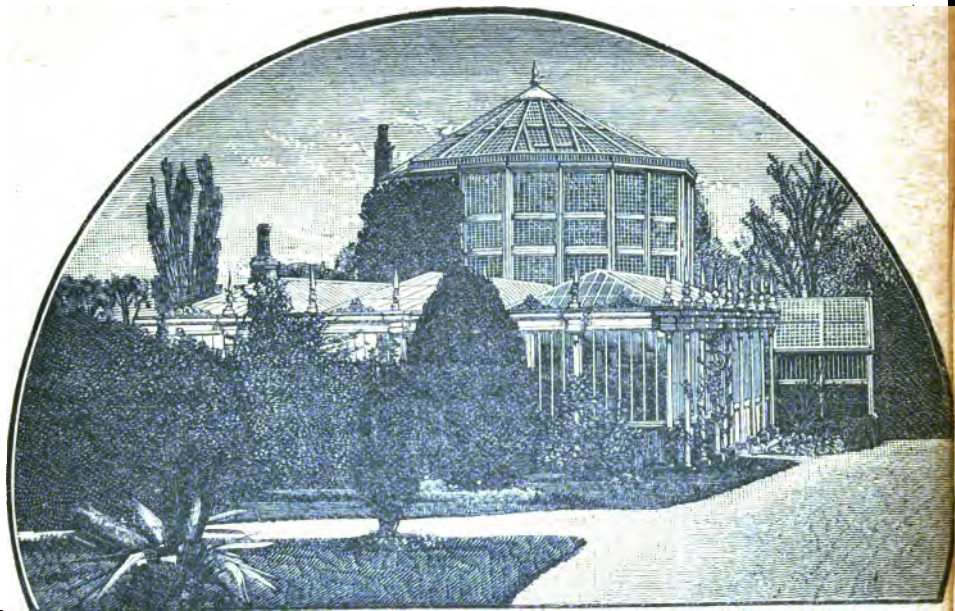
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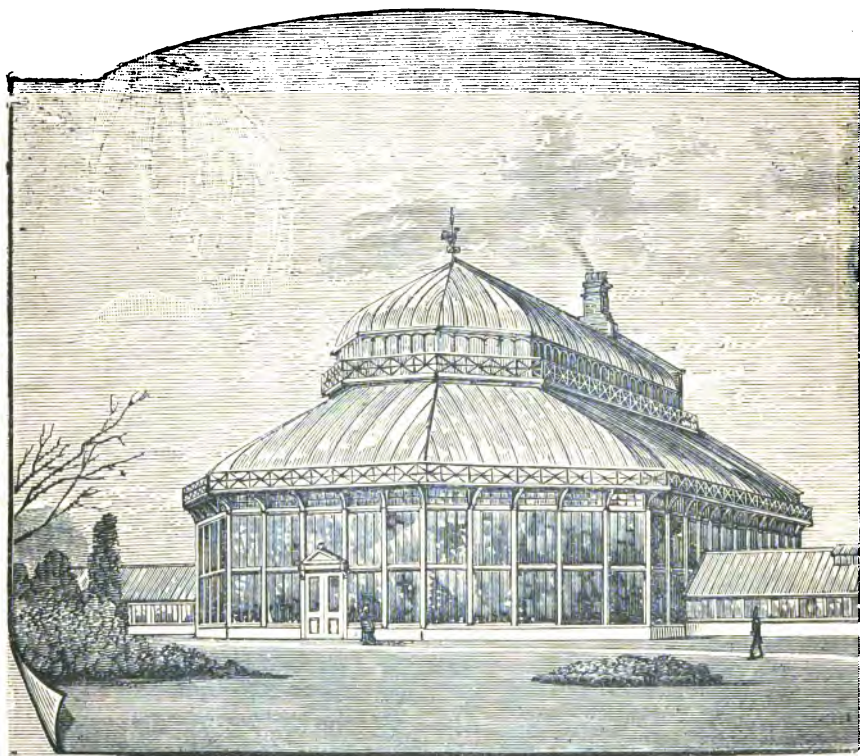
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OCTAGON HOUSE, [No. 1], AND VICTORIA REGIA HOUSE, [No. 2].



THE GREAT PALM HOUSE, [No. 7].

X
Science and Art Department.

GUIDE

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PREFACE.

THE present Guide to the Royal Botanic Gardens at Glasnevin constitutes an important member of a series of Hand-books now in process of being issued by the Department of Science and Art, with reference to the collections contained in the several institutions which are administered by the Department.

The Guide, originally drawn up by the late Dr. Moore, having been long out of print, and being no longer applicable to the Gardens in their present altered condition, has been largely rewritten and enlarged by the Scientific Superintendent, Professor W. R. M'Nab, M.D. The illustrations are to some extent identical with those in Dr. Moore's Guide, but in addition it will be observed there are figures of the principal houses, for permission to reproduce which the thanks of the Department are due to the proprietors of the "Gardener's Chronicle."

The ground plan has been prepared from a recent survey, and the interest and care bestowed upon it by the Officers of the Ordnance Survey merit our acknowledgment.

V. BALL,

Director,

Science and Art Museum.

LEINSTER HOUSE,

July 28th, 1885.



GUIDE

TO THE

ROYAL BOTANIC GARDENS, GLASNEVIN.

INTRODUCTION.

About the year 1790, the Members of the "Right Honourable and Honourable Dublin Society" resolved to form a Botanical Garden for promoting scientific knowledge in the various branches of agriculture and planting, as well as to increase and foster a taste for practical and scientific botany. This resolution was soon afterwards carried into effect, and the present establishment was founded and endowed by the Irish Parliament.

The first parliamentary grant for this purpose was made in the year 1790 ; and subsequent grants were also made, which together amounted in 1794, to the sum of £1,700, when Parliament directed the whole of this money to be applied towards "providing and maintaining a Botanical Garden." A committee of Members of the Society was accordingly appointed to take suitable ground, and to make the necessary arrangements connected with the commencement of the garden. The Lord Bishop of Kilmore reported to the Society, on behalf of this committee, in March, 1795, that having examined various situations, none had been found so eligible as the ground at Glasnevin, held by Major Tickell, by a *toties quoties* lease, from the Dean and Chapter of Christ's Church. The committee recommended that the interest in this lease should be purchased by the Society, and the Garden commenced forthwith. The consent of the Society having been obtained, the ground was accordingly taken, and the formation of the Garden proceeded with.

Not only the suitability and beauty of this site, but the classical and historical interest attached to the neighbourhood of Glasnevin may have had some weight with the committee in recommending it

for conversion into a Botanic Garden. The demesne had been that of Tickell the poet, who is known to have planted many of the trees. The house* in the grounds was that in which he had enjoyed the society of Addison, during the time the latter acted as private secretary to the Marquis of Wharton, in 1714. Near at hand was Delville, the residence of Dr. Delany, the friend of Swift, where Stella resided for a short time. Steele and Parnell were also residents in the neighbourhood of Glasnevin.

As soon as the Society got possession of the ground, the formation of the Garden appears to have been rapidly proceeded with. In 1798 and 1799, Parliament each year appropriated a sum of £1,300 for the support of the Garden; and in 1800, assigned £1,500 to the Committee of Agriculture of the Dublin Society for that purpose, as well as for the payment of the salary of the Professor of Botany.

At this time a plan of the Garden was published in a prospectus, which announced that the Dublin Society had formed a Botanic Garden, pursuant to Act of Parliament. In this prospectus the different departments of the Garden are described, and the purposes defined to which each was to be applied. "The Linnæan Garden, for the scientific botanist, who studies the plants systematically; the Cattle Garden; the Hay Garden; the Esculent Garden; the Dyers' Garden; the Irish Garden," &c. It is further stated that the "Professor gives lectures on Botany in general, and also separate lectures on the Cattle and Hay Gardens, for the instruction of the common farmers, their servants, and labouring men, all of whom are admitted to the lectures gratis." And lastly, "That like lectures are to be given for the Dyers' use, and for the purpose of extending practical knowledge, particularly in husbandry."

In accordance with this arrangement, the Garden appears to have been successfully managed for a considerable length of time, the whole annual expenditure being provided for by money granted by the Imperial Parliament. Dr. Wade was the first Professor; and Mr. John Underwood was recommended to the Dublin Society by the late Mr. Curtis, author of the *FLORA LONDONENSIS*,

* The house now enlarged and improved is the residence of the Curator, and was formerly occupied by the Professor of Botany.

BOTANICAL MAGAZINE, &c., as a fit person to conduct the practical part; Mr. John White being appointed as his principal assistant on the recommendation of Mr. Foster.

In all these preliminary arrangements, Mr. Speaker Foster (afterwards Lord Oriel) appears to have been the prime mover, and he continued to take a great interest in the establishment during his life-time.

"A Systematic Catalogue of Green and Hot-house Plants in the Dublin Society's Botanical Garden, at Glasnevin," was published in 1801, and another systematic catalogue of the Arboretum, Fruticetum, and Herbarium in 1802. These catalogues, by Mr. Underwood, show that the collection must have been very rich, notwithstanding the short period which had elapsed since its formation. The catalogue of 1801 contains the plan and elevation of the hot-houses and conservatories then existing. These were five in number in parallel series; a large central conservatory with two green-houses on the one side, and a hot-house and stove on the other. The houses which were designed by E. Parke, Architect, were on the site now occupied by the walk leading from the Entrance Gate to the Octagon House, and were built with their ends facing the south. The Building Committee, in 1804, reported that during the four preceding years, they had expended £9,476 on buildings at the Botanic Garden. The houses were connected by a corridor with the house now occupied by the Curator, to the south-west end of which a green-house was also attached.

Dr. Wade published his "Flora" of the County of Dublin, in 1794, next published his "*Plantæ Rariores*" in 1804, and both these works were calculated to promote a taste for botanical research. These were followed, in 1808, by an Essay on the "Indigenous Grasses of Ireland," by Mr. John White, a work which appears to have been of much practical utility, in directing attention to the best hay and pasture grasses. The Essay on Willows was published by Dr. Wade, in 1811, when considerable attempts were made to extend the cultivation of osiers in Ireland.

The Committee of Botany, which had been specially appointed to manage the details of the Garden, recommended from time to time various alterations and improvements. In 1813, the exotic plants

in the hot-houses had so increased in number and size, that the want of accommodation for their proper cultivation was seriously felt, and a range of three small houses was erected near the Entrance Gate.

In 1815, the two handsome Gate Lodges were built at the expense of the benevolent Thomas Pleasants, one of the Members of the Dublin Society.

The construction of the principal range of hot-houses being faulty, and the site where they had been placed badly selected, it was recommended by the Committee of Botany that the range should be removed to the situation where the large Palm house now stands. This was effected in 1817-18; and in 1819, the octagon house, which is 40 feet high, was built for the purpose of accommodating a noble specimen of the Norfolk Island Pine, which had outgrown the house in which it was placed. This beautiful plant was unfortunately killed during the operation of moving it.

From 1819 up to 1830, it does not appear that any alterations of much importance were made. During this period Dr. Wade died; and in 1826, Dr. S. Litton was appointed Professor of Botany. The principal departments of the Garden still continued in nearly the same state as described in the prospectus of 1800.

In 1830, the Committee recommended a number of improvements of a very important nature, among which were, that the Cattle and Hay Gardens should be abolished, and a much larger portion of the Garden used for horticultural purposes. The extension of the Arboretum was also recommended, and more space was to be devoted to the arrangement of plants in natural orders. The houses were examined and it was recommended that the worst be taken down, and a range of cast-iron houses, for which a plan was furnished, erected in their place.

The advanced age of Mr. Underwood, who had held his appointment for thirty-six years, rendered him unfit to carry these changes into effect. He was therefore superannuated, along with his principal assistants, and in 1834, Mr. Ninian Niven was appointed as Superintendent, with fuller powers than his predecessor had enjoyed. With the assistance of the Society, and more especially of the Committee of Botany, Mr. Niven was enabled at once to commence extensive alterations and improve-

ments, with which he had made great progress at the time of his resignation four years after. The hot-houses underwent a general repair, and were stocked with supplies of the more recently introduced plants. The plan of the Garden was entirely changed, and the departments altered and modernized,* so that we may say that the Garden now entered on the second period in its development. A different class of assistants was introduced, and a general system of professional instruction established; the result of all this was, that a great amount of public attention was directed to the Botanic Garden, and its utility increased.

In the year 1838, Mr. David Moore was placed in charge of the Botanic Garden, and from that time, by the special aid of Her Majesty's Government, and the assistance of the Royal Dublin Society, along with the zealous co-operation of the Committee of Botany, a series of alterations were made, calculated to accommodate the establishment to the more advanced state of botanical science, and to increase its popularity and usefulness to the public in a scientific and educational, as well as in a practical point of view.

All the old houses, except the octagon, were removed, and the splendid range of curvilinear wrought iron conservatories was built in 1843, at a cost of upwards of £5,000; £4,000 of which was defrayed by the Government, in two sums granted specially for the purpose, and the remainder by the Royal Dublin Society. The portion supplied by the Royal Dublin Society was chiefly raised by private subscription among the Members, and part was taken from the reserve fund of the Society. The plan of the first house was furnished by Mr. Ferguson, at that time Master of Architectural Drawing in the Government School of Art; and the house itself was erected by Mr. Clancy. The design of all the other houses in that range was by Frederick Darley, Esq.; and they were erected by Mr. Turner, of the Hammersmith Works, Ball's Bridge, Dublin. The second range, of which the large Palm House forms the centre, was finished under the management of the Board of Works, in Ireland. The first Palm House, built in 1862, was from the design furnished by James Owen, Esq., the Architect of the Board of

* See The Visitor's Companion to the Botanic Garden, Glasnevin, by Ninian Niven, Superintendent of the Royal Dublin Society's Botanic Garden, &c., Dublin, 1838. William Curry, Jun., & Co.

Works, the expense, as well as that of the side houses, having been defrayed by Government. The Palm House, which was severely damaged by the gales of the Autumn of 1883, was removed, and a handsome new structure erected in 1884, by Messrs. Boyd and Company, of Paisley, at a cost of £5,000. The Orchid House was built in 1854, a special sum of £1,000 having been voted by Parliament for the purpose, and the Victoria House for the large water lily was built by the Royal Dublin Society in the years 1854-55.

After the death of Dr. S. Litton, in the year 1846, Dr. Harvey, the distinguished botanist and traveller, was on the following year appointed as his successor. Dr. Harvey delivered two courses of lectures annually ; one at the Royal Dublin Society House, Kildare-street, the other at the Botanic Garden. In 1854 a change was made by the Government, respecting the Professors and their lectures. Now no lectures are delivered at the Garden, but they are delivered in 51 Stephen's-green, East, by the Professor of Botany at the Royal College of Science, who gives occasional demonstrations to his class at the Garden, and under certain conditions permits the students of the College to use the Botanical Laboratory for study or original research. The flowers and plants required for instruction in Botany at the Royal College of Science, are supplied by the Garden, as well as those required by pupils studying at the Dublin Metropolitan School of Art.

It has been already stated, that the Botanic Garden, from its commencement, has been mainly supported by Government aid, which until 1854 was supplied out of the sum annually voted for the Royal Dublin Society. From 1854 till 1877 it was included in the vote taken for educational purposes in connection with the Science and Art Department of the Committee of Council on Education, the grant being however administered by the Royal Dublin Society.

In 1877, by special Act of Parliament, the Royal Dublin Society relinquished the control of their Garden, Museum, and School of Art, and transferred them to the Science and Art Department. The Botanic Garden is thus now entirely under the control of the Government, the whole expense being charged to the vote of the

Science and Art Department. The Garden may thus be said to have now entered upon the third period of its development.

In 1879, Dr. Moore died, and was succeeded by his son, Mr. F. W. Moore, the present curator.

In 1880, Dr. M'Nab, Professor of Botany at the Royal College of Science, was appointed Scientific Superintendent and Referee.

The extent of ground occupied is nearly thirty-one statute acres, resting on the geological formation called calpe limestone; and consequently not favourable for the growth of many kinds of American plants, and others which dislike calcareous soil. About ten acres have also been recently added and are being converted into an Arboretum. The soil is, however, of no great depth in most parts of the Garden, and it is difficult to get trees to develop to any great size.

GENERAL OBSERVATIONS.

The Botanic Garden, in its present state, can be treated of under four different divisions.

I. The Conservatory department, which includes all the houses erected for preserving exotic plants.

II. The arrangements of hardy herbaceous plants, including the compartments which contain the British and Irish species, the medicinal species, and the general collection.

III. The arboretum and fruticetum, or tree and shrub divisions.

IV. The experimental divisions of culinary and agricultural plants.

I.—THE CONSERVATORY DEPARTMENT.

On entering the gate, the visitor cannot fail to observe the OCTAGON HOUSE, which we shall call *No. 1*. Visitors may follow the walk leading to it, to begin the inspection of the Hot-houses and Conservatories, which are numbered in regular succession.

One of the first plants which is likely to attract attention is the curious scaly-leaved Pine *Araucaria imbricata* (1), which is growing on the border leading to the house, and standing next a Deodar or Indian Cedar. The plant is called Chili Pine from its native country where it forms dense forests, similar to our Scotch fir

forests. The Chilians eat the seeds of this plant, as the Italians do the seeds of the Stone Pine, and the inhabitants of the Himalaya Mountains the seeds of *Pinus Gerardiana*. The first plants introduced in 1794 were raised from seeds obtained by Archibald Menzies, surgeon and botanist in Vancouver's voyage. The Viceroy of Chili gave a dinner to the officers of the ship, and at dessert some nuts were on the table, which being strange to Menzies, he took some of them on board ship and planted them in a box of earth. Five plants were raised in this way, and three of the trees are still living, one at Kew, another at Windsor Castle, and the third at Dropmore, this latter being now over sixty feet in height.

On the right of the walk to the Octagon House is situated a building in which lectures were formerly delivered, now used as Herbarium, Library, and offices, while a small side room has been converted into a Botanical Laboratory for the use of the Scientific Superintendent (see Map A). On the left is the Curator's House with the Curator's Office (see Map B), which is connected by telephone with the offices of the Science and Art Museum, in Kildare-street.

THE OCTAGON HOUSE, No. 1.

The OCTAGON HOUSE, No. 1, was originally built to contain a fine plant of the Norfolk Island Pine *Araucaria excelsa*, then supposed to be larger than any plant of the same kind in Britain: it was unfortunately killed during the time the house was erecting.

This building is now mainly used as a tree fern house, and affords accommodation to a number of the hardier sorts. The large ferns seen here are mostly natives of Australia and New Zealand, or South Africa, and thus belong to the great Southern Flora of the globe.

The Tree ferns, about 200 in number, belong to a special family of the great class of ferns, namely, to the *Cyatheaceæ*, distinguished from the *Polypodiaceæ*, of which there are about 3,000, by minute characters derived from the spore-cases. Many tree ferns are natives of the Tropics, particularly of South America, and these are at present cultivated in the Palm House on account of the want of a special fern house.

Travellers who have had opportunities of seeing tree ferns fully developed in their native countries generally coincide in considering them to be among the most interesting and beautiful plants in the whole vegetable kingdom. *Alsophila excelsa* (2), from Norfolk Island, of which there is a small plant, grows to heights varying from thirty to forty feet, and its trunk has even been found fifty-seven feet high, with leaves seven to twelve feet long. *Alsophila australis* is another fine species from Australia, with a fine tree-like stem. *Alsophila Moorei* is also cultivated in this house. *Dicksonia antarctica* (3) is another imposing tree fern, of which there are some good specimens in the group. It is the great bush tree fern of Australia, so well known to British settlers in that country. *Dicksonia squarrosa* is an elegant species from New Zealand, and is at present the tallest plant in the house; and *Dicksonia Youngii*, named in honour of Sir John Young, a former governor of New South Wales, is yet rare in British collections. Other species of *Dicksonia* are also represented, as *D. Schiedeii*, from Mexico; *D. Sellowiana*, from North America; *D. chrysotricha*, from Java; as well as *D. Culcita* and *D. fibrosa*. *Cyathea medullaris* (4), the black-stemmed tree fern, is a native of New Zealand, where it is known under the name of black tree fern; and *Cyathea dealbata*, with the large leaves beautifully silver-coloured underneath, is from the same country; the plant in the house is a very handsome one, and at present about ten feet high. Other species of *Cyathea* are *C. Burkei* and *C. Dregei*, from South Africa; and *C. Smithii* and *C. Cunninghamii*, from New Zealand.

Among the cool ferns cultivated in this house, and of which there is a fine collection, may be mentioned the curious *Woodwardia radicans* (5), with its large buds which form new plants. There are also examples of *Todea barbara* and *hymenophylloides*, belonging to the *Osmundaceæ* and allied to our Royal fern (*Osmunda regalis*). *Marattia laxa* and *alata* belong to the special group of the *Marattiaceæ*, distinguished from true ferns by their stipules and spore-cases. Among other ferns worthy of note is the curious Bird's Nest Fern, *Asplenium Nidus* (6), a native of Australia.

Among other plants in this house worthy of mention, are the following:—*Clethra arborea* (8), from Madeira, a plant belonging

to the Heath family ; *Phyllocladus rhomboidalis* and *Podocarpus ferruginea*, two remarkable coniferous plants from New Zealand ; *Cordyline oblecta* (*Baueri*) (9), one of the tree Liliaceæ from Norfolk Island ; and the beautiful Australian (Queensland) Palm, *Seaforthia*, or *Archontophoenix Cunninghamii* (10). *Lapageria rosea*, a beautiful climber from Chili, is also cultivated here.

THE VICTORIA REGIA HOUSE, No. 2.

On leaving the Octagon House, visitors proceed to the house nearest it, No. 2, the VICTORIA REGIA House, where the magnificent Water Lily, which has been named in honour of Her Majesty Queen Victoria, is cultivated. It is only during the summer and autumn months that the *Victoria regia* (11) can be seen, as it is treated like an annual : the seeds, which are not larger than those of a common garden pea, are sown in January, and the young plants are not ready to be placed in the large tank in the Victoria House sooner than April, when the leaves are only a few inches in diameter. The plant increases so rapidly in size, that by the end of July the leaves are generally about six feet in diameter, when their margins become elevated, so as to show their prickly purple under-surfaces—indications of the plant being about to flower, which it generally does towards the end of July.

The *Victoria regia* is a native of the great tributaries of the Amazon and of the rivers of Guiana and La Plata. It was first noticed by Haenke (a celebrated botanist, who was sent in 1801 by the Spanish Government to investigate the vegetable productions of Peru), in marshes by the side of the Rio Mamoré, one of the tributaries of the Amazon. In 1820 it was noticed in Corrientes by M. Bonpland, and specimens collected in the river Paraná were transmitted to Paris by M. D'Orbigny. Dr. Poeppig re-discovered it, and in 1833 published a description of the plant under the name of *Euryale amazonica*. *Victoria* is, however, botanically distinct from *Euryale*, a genus limited to India and China. In 1837, Sir R. H. Schomburgk discovered the *Victoria* in the Berbice river in British Guiana, and after many abortive attempts it was successfully introduced into cultivation in 1849.

The leaves are about six or seven feet across, and capable of supporting a considerable weight. The flower is about a foot across,

and emits a powerful and pleasant odour. It is of a white colour, delicately tipped with pink, becoming darker before it fades, which it does on the third day. The fruit contains many seeds with a farinaceous perisperm, forming when roasted a valuable article of food, being not unlike maize. According to Bonpland, the farina is superior to that of maize, and is preferred to the finest wheat, and to the flour of the White Cassava.

In one of the corner tanks there are plants of *Nelumbium speciosum* (12), the Sacred Bean of India, belonging, like the *Victoria*, to the Water Lily family, and a plant of much historical interest. It is supposed to be one of the plants called the Egyptian Lotus, figured on the ancient sculptural monuments of Egypt, though no longer found growing in that country. It is noticed by Herodotus (413, B.C.) He describes it as like a rose with a certain fruit at the top of the stem, in form like a wasp's nest, containing divers kernels the size of an olive stone, which are eaten either tender or dried. The canals and rivers in many parts of China furnish this plant in abundance, where the inhabitants cultivate it extensively as a culinary vegetable, from the quantity of starch in the rhizomes. It is still held sacred by the Hindoos, who sculpture the leaves and flowers on the ornamental parts of their temples and other places of worship.

Several kinds of red, blue, and white Water Lilies, which are natives of the tropics, are grown in the smaller tanks, along with other interesting aquatics which require a good deal of heat. The chief species are *Nymphaea caerulea*, *N. rubra*, *N. dentata*, and *N. gigantea*. The rice of Commerce, *Oryza sativa* (13), may be seen ripening its grain here, in August and September. Also the "Taro" plant, *Caladium esculentum* (14), one of the Arum family, the rhizomes of which are extensively used for food by the South Sea Islanders. Other species, also included under the general name of Taro, are used for the same purposes in tropical India and in the West Indies.

Among other water plants cultivated in this house may be mentioned *Azolla caroliniana*, *Trianea bogotensis*, *Pistia stratiotes*, *Salvinia natans*, and *Limnocharis Humboldtii*. Here also are cultivated many of the remarkable plants belonging to the Ginger family, as *Hedychium*, *Canna iridiflora*, and the curious *Thalia dealbata*.

Plants of *Sarracenia*, a genus of North American Pitcher Plants called Side-saddle Flowers, from the peculiar form of the stigma, are at present cultivated in the Victoria house. The common North American species is *Sarracenia purpurea* (15). The leaves are tubular, and contain a fluid which attracts insects, here especially a small kind of ant, which abounds in the hot-houses, so much so that several hundreds of the dead bodies of these creatures can be occasionally emptied out of one leaf. In these pitchers the animal matter becomes putrescent, and the putrescent matter is absorbed, there being no true digestion as in *Nepenthes* and *Drosera*. There are two other plants in the collection which have similar pitcher-like leaves—viz., the interesting little Pitcher Plant from Australia, *Cephalotus follicularis*, which grows in marshes at King George's Sound, and the rare *Darlingtonia californica*, from the north-west coast of America.

THE AUSTRALIAN OR NEW HOLLAND HOUSE, No. 3.

No. 3, the *New Holland House*, is the first in the curvilinear roofed range. This conservatory, which is 100 feet long, is principally occupied with plants that are natives of Australia and of the Cape of Good Hope, and thus representatives of the great Southern Flora of the globe. Two forms of blossom will be observed to prevail among them; the one with flowers in round-tufted heads resembling in some degree our common thistle; the other papilionaceous, or pea-blossomed flowers. The tuft-headed plants belong principally to the natural order, *PROTEACEÆ*, and the pea-blossomed plants to the section *Papilionaceæ* of the order *LEGUMINOSÆ*, both of which abound in those countries.

Some of the *Proteaceæ* in this house are magnificent specimens of great interest and value, as they are very rare in collections. Among the more important are *Hakea Victorix* (16), *Banksia speciosa*, *B. dryandroides*, *B. pteridifolia*, and *B. marcescens* (17), and are good examples of one of the most typical families of the Southern Flora. They have brown conical heads of flowers, and afford, when in full bloom, a considerable supply of honey, which is sucked by the aborigines in New Holland, who take the heads of the flowers and draw them from one side of the mouth to the other. They are commonly known as Australian Honeysuckle. The secretion of honey from some species is so great that the ground below

the plants becomes wet with it, and as it intoxicates bees and wasps they are frequently drowned in the nectar. Some of the Proteaceæ from the Cape of Good Hope are also known as Honey Flowers. The leaves of *Banksia* and *Dryandra* are remarkable for the regularity of their curiously cut edges, those of *Dryandra formosa* (18), being peculiarly elegant, and they are further of interest from their hard dry texture. The genus *Banksia* was named in honour of Sir Joseph Banks, and *Dryandra* after his librarian, the celebrated Jonas Dryander.

As examples of the Papilionaceous Australian plants, usually remarkable from their possessing ten free stamens, we may instance the following genere, examples of which are usually to be met with in the house:—*Pultenæa*, *Brachysema*, *Chorizema*, and the pretty blue flowered *Hardenbergias* which twine round the pillars.

Of other plants which deserve special mention in this house are the beautiful *Beaufortia decussata* (19), one of the Myrtle family, and the rare *Calliandra Tweediana* (20).

During the spring months a number of kinds of *Acacia* are usually in flower, and these may at once be known by their pretty globular heads of yellow flowers and curious phyllodia or flattened leaf-stalks, which perform the functions of leaves; these have both surfaces alike, as is also the case with many other New Holland plants. As a type *Acacia marginata* (21) may be specially mentioned.

The Camphor tree, *Cinnamomum Camphora* (22), Nees, which yields the Camphor of Commerce, is also cultivated in this house. The tree is a native of Japan and China. The root, trunk, and branches, broken up, are heated with water, in closed vessels, the volatilised Camphor being sublimed upon Rice-straw.

There are, further, a number of plants in this house requiring special mention, of which the most important are *Datura cornigera*, *Ioichroma Warczewiczii*, *Habrothamnus Hugelii*, and *Newellii*, all belonging to Solanaceæ or Potato family; *Plumbago capensis* (24), *Fuchsia corymbiflora* (25), *Cobaea scandens*, *Passiflora*, *Lonicera semperflorens*, and *Schottia brachyphylla*—all these are attached to the pillars or climb to the roof. Others on the floor or steps are *Witsenia corymbosa* (26), *Dammara australis* (27), *Araucaria Cunninghamii*, *Chamærops humilis*, *Astelia*

Banksii, and *Phormium tenax variegata* (28). The latter being a variety of the well-known New Zealand Flax.

The New Zealand Flax, *Phormium tenax*, yields the Phormium fibre of commerce. The New Zealanders make all their common apparel from the fibre of the leaves which they extract with very little preparation, and also manufacture into strings, lines, and cordage. The fine slender fibres have a silky gloss, as they are obtained by the natives, but up to the present, the manufacture of fibre by methods applicable to flax or hemp, has not been attended with success. The plant belongs to the Liliaceæ, the lily family, and thrives well in the South of Ireland.

Some of the medicinal species of Aloe are cultivated in this house. The greater portion of the Aloes of Commerce is prepared from *Aloe vulgaris*, but there are specimens here of *A. socotrina*, *A. barbadensis*, and *A. purpurascens*.

In this house there is also a collection of succulent plants, i.e., fleshy-leaved plants. Their curious forms are sure to attract attention. They are chiefly natives of the hottest sandy plains of the Cape of Good Hope, where they are frequently exposed for months to a burning sun, without receiving any moisture from rain. A considerable number belong to the genus *Mesembryanthemum*, a compound word signifying mid-day flower. The blossoms of most of the species only expand when the sun shines brightly on them. Their seed vessels exhibit a singular hygrometric phenomenon, which is well calculated for preserving the species in the arid places they inhabit, as they only open to discharge the seeds after a fall of rain, when the ground is in a state fit for the seeds to germinate.

Other plants belonging to a special group of succulents are the Cactuses of the New World, being wholly American in their distribution, but occurring both in tropical and temperate America. One of the most remarkable is the Old Man's Head Cactus, the *Cereus senilis* (29). Mixed with the Cactuses are certain forms of *Euphorbia*, plants belonging to a very different division of the vegetable kingdom, but having a great resemblance to Cacti. They inhabit the dry regions of Africa, and may be said to represent in the old world the Cactuses of the new world.

During the summer, the plants belonging to this house are usually put out into the open air, as it is then winter in the southern regions, from whence they come, and the house is filled with ordinary green-house plants. In the autumn the chrysanthemums are also exhibited here and usually make a fine show.

Proceeding onwards, we come to the part of the house leading to the large centre house, and which is not separated from the one we have been inspecting by any partition. The two parts united form one wing of the range, and is 150 feet in length.

This part of the house is devoted to the cultivation of Heaths, of which the garden possesses a good collection. The Heaths are mostly social plants, naturally abounding either in quantity or variety, and sometimes in both; but limited in geographical distribution. Europe and Africa are the two quarters of the globe of which Heaths are principally natives; America does not supply a single species, except the common *Calluna vulgaris*, which reaches Newfoundland, where it grows sparingly; neither are there any found in Australia, where the beautiful genus *Epacris*, which bears considerable resemblance to them, and belongs to a closely allied natural order, appears to take their place.

The species of *Erica* here cultivated are mostly natives of the Cape of Good Hope, where nearly four hundred different kinds are said to grow spontaneously, hence commonly spoken of as Cape Heaths. All the species, both tender and hardy, are desirable plants; and many of them are exceedingly beautiful; more particularly some of the hybrid forms which have been raised by horticulturists. During the spring months, when the fine long-tubed sorts are in bloom, few plants make a handsomer appearance.

On the wall in this house is a fine specimen of the curious *Ruscus androgynus*, remarkable for the flattened shoots which perform the functions of leaves.

THE GREAT CENTRAL HOUSE, No. 4.

We now enter No. 4, the great Central House of the range, which is 40 feet high. The plants here are chiefly natives of Australia, South America, and Mexico. A few of the hardier palms which survive our ordinary winters without much artificial heat are cultivated here. Conspicuous among them is the Date Palm,

Phoenix dactylifera (30), which is the true Palm Tree of Scripture, and that which produces the common date fruit of commerce. The sweetest dates are grown at Medina, one of the celebrated cities of pilgrimage, but the same species is of frequent occurrence in many parts of Arabia and Africa.

The Date palm is a native of Northern Africa and the Sahara, and has been introduced into Spain and other parts of southern Europe. It is the palm of the Oases of the Desert. It grows to a height of about 60 to 80 feet, has plume-like leaves and produces 20 or 30 bunches of fruit. These fruits are highly nutritious, and form an important article of food for millions of people; the population of Fezzan living on dates for about nine months of the year. The date stones are ground and used as food for camels and other animals, and have recently been used as a substitute for coffee. The plants are either male or female, and the process of palmification consisted in bringing the male flowers of the wild date from the desert and placing them near the cultivated female trees.

Among the coniferous trees which are natives of New Holland and New Zealand, the "Bunya Bunya" of the natives, *Araucaria Bidwilli* (31), is conspicuous. The leaves resemble those of the Chili pine, *Araucaria imbricata*, and the plant produces large cones containing edible seeds, which during a portion of the year afford a supply of food to the aborigines of Australia, who resort periodically to the places where this pine grows, near Moreton Bay, for the purpose of feeding on its seeds. The famous Norfolk Island Pine, *Araucaria excelsa*, attains to a great size in its native country, and forms one of the most beautiful trees in the world. *Araucaria Cunninghami* (32), Moreton Bay Pine, stands near it. This species commemorates the late Allan Cunningham, who held the situation of Colonial Botanist at Sydney, N.S.W., through whose indefatigable and successful explorations of that country and the neighbouring islands many interesting plants were procured for our gardens, and extensive data obtained for the advancement of botanical science. *Araucaria Cooki* is another species which is named in honour of the great British circumnavigator, Captain Cook. Another beautiful plant of the Pine family, *Dammara obtusa*, may be seen here, as well as *D. ovata* and *D. Moorei* (33). The

latter when full grown forms a very ornamental tree, resembling our weeping willow. They are all natives of the New Hebrides. The Kauri Pine, *Dammara australis*, is a valuable tree in New Zealand, where it yields fine straight clean poles, which are in much request for forming masts and spars for vessels. It also yields a gum, called Kauri gum. A curious Indian plant, *Bucklandia populnea*, here cultivated, is worth notice, as is also the magnificent specimen of *Luculia gratissima*. During the winter this house contains a number of fine plants of *Rhododendron*, more especially *R. arboreum* (34) and *R. Nuttallii*. Cape and Australian plants also find a place here in winter, and are turned out of doors in summer. Two other plants are worthy of notice, namely, the Camphor tree; and the Flame tree, *Brachychiton acerifolium* (35). This plant receives its name on account of its producing a large number of brilliant scarlet flowers before it unfolds its leaves. The plant thus appears to be on fire. Other plants are also described as flame trees from the same habit and colour of flowers.

THE GREAT TROPICAL STOVE, No. 5.

On passing through the Central House, the visitor enters No. 5, the first part of which is chiefly devoted to tropical American Cactuses. It is most unfortunate that these plants which require a special house for themselves, on account of the dry atmosphere they thrive best in, have not yet been properly housed, as a "succulent house" forms a most interesting and attractive feature in a garden. Cacti are usually very singular looking members of the vegetable kingdom—some of them, as they are trained round the supporting stakes, appear like large snakes, others like sea urchins, others like fluted columns. They are chiefly natives of Mexico, and the warm mountainous districts of South America. *Rhipsalis* is the only example of the family not found in America.

The first great collection of these curious plants was sent to this country by the late Dr. Coulter, who, at great expense and trouble, had all the species he could procure within a radius of thirty or forty miles in Mexico, collected and sent to Dublin, to be presented to the Botanic Garden of Trinity College. The appearance of so many novelties caused a great sensation at the

time, and a desire for collecting them in those countries soon became general. Some of the globular species, Turk's Cap or Melon Thistles, *Melocactus* and *Echinocactus*, attain to a prodigious size. A plant of *Echinocactus visnaga* from Mexico, received at Kew in 1846, measured nine and a half feet in circumference, and weighed one ton. The interior of these plants is filled with soft succulent pulp, and they are useful, in places where they grow; to several animals, which, after long droughts, endeavour to procure this watery pulp to quench their thirst. Humboldt informs us that, when long droughts occur on the steppes of South America the numerous herds of horses which roam over these grassy plains, frequently save themselves from perishing by first scratching the spines away from the round Cactuses with their feet, and then sucking the pulp. He further adds, that it is no uncommon thing to see numbers of them lame from this cause, by the thorns getting into their feet when endeavouring to clear them away.

The Prickly Pear section, as it is generally called, has flat stems, jointed one piece to the other. In dry warm countries the strong-growing kinds are used for making fences, which are very formidable, both to infantry and cavalry, in cases of warfare. The plant on which the cochineal insect feeds, is one of these flat-stemmed species, *Opuntia Tuna* (36), which may be seen near the end of this house, where it joins the large stove. These plants are cultivated to a great extent in Mexico, and have also been introduced into Southern Europe, for the purpose of feeding the insect, which yields the rich scarlet dye called cochineal. *Opuntia Ficus-indica* and *O. vulgaris* are the "Indian Figs" whose fruits are known as Prickly Pears. In Sicily the plants grow on the roughest lavas of Etna where nothing else will vegetate, and the large cooling fruits can be sold for less than 2d. for thirty.

The far-famed night-flowering *Cereus* is also among the curious plants in this house. It is not, however, so notable now as it formerly was, since it is found that several species of this family bloom at night only. *Cereus grandiflorus*, and *C. Macdonaldiae* (37) are among the finest. They generally flower in August, when the blossoms begin to open about seven o'clock in the evening, and continue to expand gradually until ten or eleven; from that time

they remain stationary for about three hours, when they begin to close, and at five or six o'clock in the morning they are nearly shut up. They only open on one night; it is therefore necessary to watch the progress of the bud, in order to see those beautiful flowers, which emit a delightful aromatic odour during the short time they remain expanded. *Cereus giganteus* is the tallest species of the genus, and attains a height of forty to fifty feet in Southern California.

Other forms worthy of notice are *Pereskia*, the only Cactus with true leaves, *Epiphyllum* and *Rhipsalis*. *Pereskia aculeata* bears an acid fruit called the West Indian gooseberry.

A small collection of *Stapelias*, or *Carrion flowers*, the square stems of which bear a close resemblance to some of the stems of Cactuses, are placed in this house. Their thick, fleshy, hairy flowers look like pieces of the skin of some animal curiously prepared, and the disagreeable odour they emit so closely resembles that of putrid meat, that they are visited by flesh flies.

Another tribe which, as already mentioned in House No. 3, closely resembles the Cactus in its general appearance, is the leafless section of *Euphorbia*. These may, however, be known from the former by a white milky fluid flowing from their stems when pierced. This fluid is, in most cases, an acid poison, whilst in others it is of medicinal importance. *Euphorbia canariensis* (38) has curious angled stems with a thick green epidermis, it is a shrub growing to a height of from ten to twenty feet and is frequent on the exposed rocky ledges of Teneriffe and other islands of the Canary group. *Euphorbia grandidentata* (39) of the Cape of Good Hope is a singular tree giving a peculiar character to the woods in the east of the Cape colony. Gum euphorbium is yielded by *Euphorbia resinifera* of Morocco, it is a powerful cathartic, and the people who collect it have to tie a cloth over their mouth and nostrils to prevent the incessant sneezing caused by the inhalation of the fine particles of the gum. The branches of the plant are used by tanners, and morocco leather owes its special peculiarities to this plant. A good plant of the Medusa headed Spurge, *Euphorbia caput Medusae*, may be seen among them, in this house; while the plants of *Euphorbia punicea* and *E. Pescatorei* also require special mention.

The *Agave americana* (40), or American Aloe as it is usually called, which is supposed to blossom only once in a century, is cultivated here in the winter months particularly, as well as some other large species of the genus. *Agave* belongs to the Amaryllis family and is thus very different from the genus *Aloe* of Africa, which belongs to the Lily family. *Agave glauca* and *Agave livida*, are both conspicuous plants, and so also is *Fourcroya gigantea* (41). The large thick fleshy leaves of these plants often weigh nearly twelve pounds each.

Some of the fibre-yielding plants are to be seen here, particularly *Sansevieria zeylanica* and *Sansevieria cylindrica*. The former yields the bowstring hemp of Ceylon; the leaves afford a very tenacious fibre much valued by the natives for making their best bowstrings.

The species of *Strelitzia*, with their gay party-coloured flowers of orange and purple, are generally in bloom during the winter and spring months, when they present a marked feature among the other plants. The genus was named in honour of Queen Charlotte, a Princess of the house of Mecklenburg-Strelitz. They are natives of the Cape of Good Hope, but require a higher degree of temperature to keep them in good health than plants from that country generally like. The most remarkable kinds here cultivated are *S. juncea*, *S. Reginae*, and *S. Niveni* (42); the latter a remarkable hybrid raised in Glasnevin Garden many years ago.

We now enter the large stove, in which is grown a miscellaneous collection of plants requiring a considerable degree of heat for their cultivation, and affording an excellent example of the Flora of the Tropics of the Old and New World.

Facing us is a remarkable group of Cactuses and Euphorbias, and on the right the wall is covered by a fine plant of *Bougainvillea spectabilis* remarkable for its showy bracts. Along the north side of the house is placed a fine collection of Bromelias, plants allied to the pineapple, and remarkable on account of their growing on the stems of trees in tropical forests, like orchids and aroids.

The centre of the house is devoted to Economic plants, of which there is a good collection. Some individual plants require special notice, such as the remarkable *Brownea Ariza* with its large masses of scarlet flowers; *Erythrociton hypophyllanthus*,

with its flowers apparently coming from the under side of the midrib of the leaf, and the curious species of *Xylophylla*.

The Sugar Cane, *Saccharum officinarum* (43) is the first economic plant we shall mention. The purplish jointed stems, with long grassy leaves, will at once distinguish it. This is the variety called the Ottaheite Cane, and is considered one of the best. The sugar in common use is prepared from the juice of the canes, which is extracted by pressing them between heavy rolling cylinders.

The Coffee Tree, *Coffea arabica* (44), may be seen at some periods of the season covered with its scarlet fruit, the seeds from the interior of which, prepared and roasted, are our well known coffee beans. Another kind of coffee is the Liberian coffee, *Coffea liberica* (45). It is a new form, now much esteemed and is worthy of notice. The Coffee tree belongs to the Rubiaceæ or Peruvian bark family, and is a small much branched tree, about 20 feet in height, with slender horizontal spreading branches and a whitish bark. It is a native of Abyssinia and tropical Africa but it is now widely cultivated in hot countries, the chief supplies coming from Ceylon, Java, the West Indies, Brazil and Central America. The perfumed white flowers are produced in clusters, in the axils of the light green opposite leaves. The fruit resembles a cherry in size and colour, and each contains two seeds, the coffee beans. The seeds are separated by mechanical means from the pulp. After fermentation and washing, the seeds pass through a rolling mill to remove the husk, and become the coffee beans of commerce. These, roasted and ground, furnish the coffee of the shops. Upwards of 1,300,000 cwts. were imported in 1882.

Coffea liberica is a glabrous shrub, native of Liberia in West Africa. It is a much more robust plant than the common coffee, and has been largely introduced into many coffee-growing countries. The plant thrives at lower elevations than *C. arabica*, and the beans are larger, but do not contain so much Caffeine.

The Guava, *Psidium Guajava* (46), whose pulpy fruits make the esteemed West Indian conserve, Guava jelly, is here. *Psidium Guajava* belongs to the Myrtle family, and is a small tree, probably native of Mexico and other parts of tropical America, but it is now cultivated and naturalized in most tropical countries for the sake of its fruits, which are used for dessert and also pre-

served. Two distinct varieties are known, the apple-shaped or red guava (var. *pomiferum*), and the pear-shaped or white guava (var. *pyriferum*).

The eastern fruits which are known by the name of 'Rose Apples' belong to the very large tropical genus *Eugenia* of which *Eugenia malaccensis* and *E. macrophylla* (47), are to be seen in this house. Closely allied is the Allspice, Pimento or Jamaica pepper, yielded by *Pimenta officinalis*, one of the Myrtaceæ. It is a small bushy tree extensively cultivated in Jamaica, particularly on the south side of the island. The fruits are about the size of currants, these are gathered before they are ripe and dried, when they assume a brownish black colour. Pimento is largely used as a spice, the flavour resembling a mixture of cinnamon, clove and nutmeg. It is also used in medicine for its aromatic and stimulant properties. By distillation the fruits yield oil of pimento. The leaves of a closely allied species (*P. acris*) yield oil of bay, used in the manufacture of bay rum, which is employed as a perfume in the United States.



THE BITTER CASSAVA.

Another plant worthy of special notice is *Manihot utilissima* (48), the Bitter Cassava, the roots of which afford the nutritive substance known by the name of Cassava bread, which is so extensively used for food in tropical America and the West Indies. Tapioca and Brazilian arrow-root is also prepared from this plant. A singular circumstance connected with these roots is, their being a most virulent poison when in a raw state, and rendered wholesome by boiling. The poisonous juices are dissipated by heat. *Manihot Aipi* is the Sweet Cassava, and is not poisonous. *Ilex Paraguayensis*, is the Paraguay Tea or Maté (49), whose leaves afford a wholesome and stimulating beverage, which is as generally used in South Brazil as tea is in Britain. The Papaw *Carica Papaya* (50), is known in tropical countries for the curious property it possesses of causing fresh meat, when hung on it, to become tender in a few hours by being suspended among its

leaves. The milk sap of the plant has recently been found to contain an exceedingly active peptonising ferment. Seemann also says that the leaves can be used as a substitute for soap.

Cinnamon is the product of *Cinnamomum zeylanicum* (51), one



THE CINNAMON TREE.

of the Laurineæ the Laurel family. It is a small tree with willow like branches, bearing alternatesimple smooth entire leaves with conspicuous longitudinal veins. The flowers are inconspicuous and the fruit is a small berry.

It is a native of Ceylon, but is cultivated and has become wild in Jamaica. The bark, prepared and dried, is imported as the well-known spice. Longitudinal incisions are made in the bark, which peels off and rolls up in the form of a pipe, varying in length, but about the thickness of the finger. Nearly two millions of pounds of cinnamon were imported in 1882. The bark of the Cassia, *Cinnamomum Cassia* is more astringent than cinnamon. It is closely allied to cinnamon and is often substituted for it.

The *India-rubber Tree* (*Ficus elastica*, Roxb.) (52) is a native of Assam, and is well known in cultivation. It is only one of the many sources of India-rubber, the product of this tree having been one of the first kinds employed in manufactures. The caoutchouc is obtained in the form of a milky juice when incisions are made in the stem. Caoutchouc or India rubber is the product of the milky juice or latex of many plants belonging to very different natural orders. The plants yielding the rubber of commerce are met with in different parts of the tropics, and each locality has its own special rubber tree. One of the most important trees is *Hevea brasiliensis*, one of the Euphorbiaceæ, which yields Para rubber. In Central America one of the Artocarpeæ, (Urticaceæ) *Castilloa elastica*, a lofty forest tree, yields Central American rubber. Ceara or Scrap rubber of commerce is the product of the Euphorbiaceous plant *Manihot Glaziovii*, closely

related to the Cassava. Several species of *Willughbeia* (Apocynæ) yield Borneo rubber; and from different species of the allied genus *Landolphia*, we obtain African and Madagascar rubber. Few plants are of greater importance than those yielding rubber, and travellers should always make particular inquiries about them. The Indian Government has successfully introduced *Hevea* and *Castilloa* into Ceylon and India, where the trees are now flourishing, and we ought soon to be independent of South American rubber.

The Peepul or Bû. (*Ficus religiosa*, L.) (53) is distinguished by its long pointed shining leaves. It is commonly met with in India near temples and houses. The Hindoos hold it sacred from the belief that their god Vishnu was born among its branches. Lac, a resin produced by the puncture of a small Hemipterous insect, is got in large quantities from the Peepul, as well as other figs, or even from trees belonging to the Leguminosæ. Another form worth notice is the *Ficus Sycamorus*, L., the Sycamore Fig. It is a large Egyptian tree, affording a fruit used by the Arabs. Its light wood was used to make the cases of Egyptian mummies, and is said to be almost imperishable. It is the Sycamore Tree of Scripture.

Some of the climbing plants in this house possess considerable interest. The "Granadilla" *Passiflora quadrangularis*, which yields wholesome fruits, and whose roots are said to be powerfully narcotic, may be seen growing near some other kinds of Passion Flowers.

The genus *Aristolochia* produces some of the most remarkable looking flowers with which we are acquainted, and several kinds may sometimes be seen hanging from the roof of this house. *Aristolochia ornithocephala*, with its curious, gray, reticulated flowers, which bear some resemblance to the head of a bird (hence the specific name), is very conspicuous. Humboldt states that the flowers of *Aristolochia cordata*, a South American species, are of a crimson colour, seventeen inches in diameter, these the Indian boys use for caps. A good idea may be afforded by those twining plants, of the Lianas, which render the virgin forests of Brazil and tropical countries at once impenetrable to man, and as Humboldt

further remarks, so accessible and habitable to the monkey tribe and smaller tiger cats. "The rapid ascent to the tops of lofty trees, the passage from tree to tree, and even the crossing of streams by whole herds or troops of gregarious animals are all greatly facilitated by these twining rope-plants, or Lianas."

On the north side of the house, is a specimen of Pareira Brava (*Chondodendron tomentosum*), a woody climber of Brazil and Peru.

Stiftia chrysantha, a remarkable South American composite plant, is worthy of special notice.

The Papyrus of the ancients, *Cyperus Papyrus* (54), stands near the centre. The pith-like tissue of the large flower stems, cut into thin strips, united together by narrowly overlapping margins, and then crossed under pressure by a similar arrangement of strips at right angles, constituted the papyrus of antiquity. It grows abundantly on the swamps of the Nile at the present time, and is also found on the Niger, and in Syria and Sicily.



THE PAPYRUS.

Xanthochymus pictorius, which is known to yield an inferior variety of gamboge, is sometimes cultivated here during the summer. The Akee Tree, *Blighia sapida* (55), which commemorates the name of the celebrated Captain (afterwards Admiral) Bligh, has an edible fruit. This tree is a native of Guinea and other parts of tropical Africa, and was conveyed to the West Indies in 1793 by Captain Bligh, of H.M.S. Bounty. He also introduced the Bread Fruit into the West Indies. We can also here observe the Cotton plants, *Gossypium herbaceum*, and *G. arboreum*, which produce the cotton of commerce; and the indigo-yielding plant, *Indigofera indica*.

There are also some rare medicinal plants, such as White Canella or wild cinnamon, *Canella alba*, whose bark yields a warm aromatic oil by distillation; the Arrowroot, *Maranta arundinacea*; Ginger, *Zingiber officinale*, and *Quassia amara*, the Quassia of commerce, are usually cultivated here. The Cinchona or Peruvian bark (56), yielding Quinine, is obtained from different species of the genus *Cinchona*, (Rubiaceæ, the Peruvian bark family) such

as *C. succirubra*, *C. Calisaya*, *C. micrantha*, *C. officinalis*, *C. Pahudiana*, &c. The extreme value of the products of cinchona bark led the Indian Government to introduce the Cinchona into India; and expeditions were sent to South America, one under Mr. Clements R. Markham, and the other under Mr. Richard Spruce, to obtain seeds. After much perilous adventure, the history of which reads like a romance, the plants have been introduced into India; Mr. Clements Markham having made four separate expeditions to different parts of the Andes for the Indian Government. Now there are extensive plantations at Ootacamund, Darjeeling, in Ceylon and in Mauritius; and the Dutch have extensive plantations in Java. No more important experiments have been made than the introduction of Cinchona, Ipecacuanha and the different Rubber trees into India. Among other useful plants may also be noticed the Mahogany Tree, *Swietenia Mahogani*; the Sapodilla Plum, *Achras sapota*, and the Cherimoyer, *Anona Cherimolia* (57). The Lace Bark Tree of Jamaica, *Lagetta lintearia* (58), is another remarkable plant, whose inner bark, by beating and macerating, but without any artificial preparation, resembles beautiful lace, as may be seen in the Museum at the gate.

Black and white pepper is the product of *Piper nigrum* (59), a plant belonging to the Piperaceæ or Pepper family. The pepper plant is a climbing Indian shrub with heart-shaped leaves, the stem producing spikes of small white flowers. The fruits are small and round like currants, green at first, but bright red when ripe and in perfection. The fruits are gathered when any of the berries on the spike are red, and then dried in the sun until they become black. Black pepper consists of the dried unripe berries, and white pepper is the ripe fruit deprived of its outer covering by maceration. The pepper plant is extensively cultivated in India, the Indian islands, and West Africa. About twenty-five millions of pounds were imported in 1882.

Tamarindus indica (60), one of the Leguminosæ, yields Tamarinds. The Tamarind tree is from sixty to eighty feet in height, with a wide-spreading head of dense foliage. It is probably a native of tropical Africa, but it is now found in all tropical countries.

It is often grown as a shade tree, or for the fragrance of its flowers, but it is chiefly cultivated for its fruits. The pods are flat, four to six inches long, and contain a sweet pulp. This pulp preserved in sugar forms the tamarinds of the shops. They have an agreeable acid taste and are used in hot countries to make cooling drinks. The chief supplies come from the West Indies and from India.

Carludovica palmata (61), the celebrated Panama hats are made from the leaves of this plant. These hats are principally manufactured in Veraguas and Western Panama, and as much as 150 dollars is sometimes given for a single one. The plants, although palm-like in appearance, belong to a special natural family, the *Cyclanthaceæ*.

Mammea americana, the Mammee Apple. A fruit much esteemed in the West Indies. It is eaten plain or in slices with wine and sugar, or preserved in sugar.

Dracaena Draco (62), the Dragon Tree of Teneriffe. One of the most celebrated trees in the annals of natural history, from the gigantic specimen which stood at Orotava. It was first described by the navigators of the early part of the fifteenth century. It had scarcely increased in size from the time of its discovery until its destruction by a storm in 1867, when it was about seventy-five feet high, and its hollow trunk was about seventy-eight feet in girth. Very little of the dragon's-blood of commerce is obtained from this tree, most of it being the product of a palm, (*Calamus sp.*)



THE BREAD FRUIT TREE.

In this house the South Sea Island Bread Fruit, *Artocarpus incisa* (63), is generally cultivated. The edible quality of this fruit is considered to be owing to the large quantity of starch contained in its composition. The bread-fruit is a staple food of the South Sea Islanders. The ripe bread-fruit is to be had more or less abundantly throughout the whole year, and is used simply boiled or baked, or is made into puddings.

The Chocolate Tree, *Theobroma Cacao* (64), which yields the chocolate of commerce, grows well, and has on several occasions produced fruit. The Cocoa or chocolate tree, *Theobroma Cacao*, belongs to the Sterculia family, Sterculiaceæ. It is a moderate sized tree, native of Central and South America, but cultivated extensively throughout the tropics of both hemispheres. The flowers are small and produced upon the old stems and branches. The fruits are large and each contains about fifty seeds closely packed in a pulp. When ripe the seeds are removed from the fruit, slightly fermented and then dried in the sun, when they acquire a brown colour and become the Chocolate bean of commerce. Roasted and broken, they form Cocoa nibs. Powdered, they form Cocoa, and when made into a paste and flavoured, they form Chocolate.

The Mangosteen, *Garcinia Mangostana* (65), belongs to the Guttiferae, the Gamboge family. It is a tree about twenty feet high, with opposite nearly horizontal branches and smooth opposite leaves. It is a native of Malacca and the Malay Archipelago, and has been introduced into Ceylon and the West Indies. The fruit is about the size and shape of a small apple, reddish-brown coloured when ripe, having a thick succulent rind, and crowned with the persistent rays of the stigma. It contains a juicy white pulp surrounding the seeds, of a delicate sweet and acid flavour. It is considered to be the choicest of all tropical fruits. The flavour is extremely delicate without being rich or luscious.

Among the plants worthy of notice in this house are the following:—The fine specimens of *Hibiscus Rosa-sinensis* var *grandiflorus* (66), one of the Mallow family. It is a native of China, and is known as the Blacking plant. The red flowers, when bruised, become black, and are used for colouring the eyebrows and for blacking shoes.

The different species of *Theophrasta*, *T. nobilis*, *T. imperialis*, *T. Jussieui*, and *T. regalis* are to be seen. They belong to the Myrsinæ, and, like *Clavija*, are remarkable for their long unbranched stem, and crown of large leaves. The *Clavija* form is one of the typical kinds of vegetation in tropical America.

The species of *Clusia*, with their remarkable aerial roots, should

be noted. *Russelia juncea* is remarkable for the green stems which rarely produce leaves, and the curious *Phyllarthron* has a jointed leaf, the leaflets which occur in closely allied genera of the same family being wanting.

Numerous examples of the genus *Croton* are here cultivated for their foliage, as well as *Dracaena*, *Heliconia*, *Ixora*, and *Justicia*.

Among climbers are examples of *Hoya carnosa*, *Combretum*, *Bignonia Tweediana*, *Quisqualis indica*, and *Bauhinia racemosa*.

THE ORCHID AND FERN HOUSE, No. 6.

Leaving the Curvilinear range, visitors are requested to cross over by the walk which leads to the front of the Palm House range. Turning to the right, we enter No. 6, the ORCHID and FERN HOUSE, which was built in 1854, when a special sum of £1,000 was granted by Parliament for the purpose. It is nearly one hundred feet long, and twenty feet wide. An entrance porch has been recently added. Into this most of the plants in flower are usually placed as the cooler temperature causes the flowers to remain longer



EPIPHYTAL ORCHID.

expanded. It is divided into three compartments, principally occupied with exotic Ferns, and the strange and interesting group of epiphytal orchids. The orchids chiefly occupy the first compartment of the house. These plants grow usually on the stems of other plants, not, however, deriving any of their food from the plants on which they grow, as is the case with parasites, but merely obtaining mechanical support. The epiphytal orchids only use the plants on which they grow as props for their roots to cling to, and do not feed on them. They are also called "air" plants, from

their being enabled to live during long periods suspended in a

damp atmosphere, without their roots being attached to any solid material. For this purpose their rootlets are admirably adapted, having a peculiar cellular coating, the velamen, in the cells of which aqueous vapour is condensed, and the water is absorbed, the plants being thus able to imbibe moisture from the damp air. The flowers of this interesting tribe are as remarkable as their singular habits of growth, often resembling various kinds of insects or animals.

The natural family *Orchideæ* includes about 5,000 species from all parts of the world. Those of the northern and southern Flora are plants growing in the soil, while those of the tropics are usually epiphytes, and clothe the stems and branches of tropical forest trees, along with aroids and ferns. Very few of the species are of any economic value, the *Vanilla* being the most important. They are, however, great favourites with cultivators in Europe, from the beauty and singularity of the flowers.

The chief genera from the tropics of the old world are the following :—

The genera chiefly confined to tropical Asia, the Malay Archipelago, and tropical Africa, are, *Dendrobium*, *Cymbidium*, *Phajus*, *Coelogyne*, and *Vanda*, examples of which can usually be seen in flower. Especially worth mention are the fine plants of *Vanda tricolor* and *Vanda Cathcarti*. Other genera from tropical Asia are *Phalænopsis* of which several beautiful species are cultivated; *Ærides*, *Saccolabium*, and *Bolbophyllum*. Some of the above also occur in tropical Africa. The remarkable *Angraecum sesquipedale* from Madagascar, flowers occasionally in the house, the spur of the flower being sometimes twelve or fourteen inches long.

The new world tropical genera are well represented. The genus *Oncidium* is a very large one, and is closely allied to *Odontoglossum*, a genus much prized for the beauty of the flowers of the numerous species. Another genus *Epidendrum* is also represented, it is among the largest genera of orchids, but the flowers are inferior to those of *Oncidium* and *Odontoglossum*. Examples of the fine genera, *Laelia*, *Cattleya*, and *Lycaste*, are also to be met with as well as *Maxillaria*, *Zygopetalum*, *Miltonia*, *Brassia*, and others.

The genus *Cypripedium* with the curious slipper-like labellum is well represented, and the remarkable forms called *Selenipedium caudatum*, and *Uropedium Lindeni* are also cultivated.

Other interesting new world genera are *Stanhopea*, *Catasetum*, and *Masdevallia*, the latter usually growing in a cooler house.

The West Indian Butterfly Plant, *Oncidium Papilio*, looks like a large insect, with wings expanded, a body, head, antennæ, &c. The different kinds of *Oncidium* have flowers formed like yellow or brown-coloured flies. The curious Dove Plant, *Peristeria elata*, has white marble-looking flowers, sculptured into the form of a dove in miniature, with wings partly expanded, as if about to rise in flight. The Swan Plant, *Cynoches Loddigesii*, has flowers with one of their parts forming a long gracefully curved neck and head.

The Venus Fly-trap, *Dionæa muscipula* (67), can usually be seen in this house. It is a native of South Carolina, and by means of its peculiar traps it catches insects which it kills and afterwards digests and absorbs the nitrogenous matter. The leaves are modified into appendages resembling a common rat-trap, which effect the purpose of catching flies or other insects that may alight on them, as certainly as the rat-trap catches rats, and likewise holds them as fast. The collapsing of the leaves is owing to the irritability of minute bristles, on their inner surfaces, causing the two sides of the leaf to close when touched. Among the most



THE PITCHER PLANTS.

remarkable plants in the collection are the Pitcher Plants, several of the species of *Nepenthes* (one of the finest, being a specimen of *N. distillatoria*) (68), may be seen here with the large and curiously formed pitchers hanging down from their stems. They are tropical Asian plants. The singular fact connected with these plants is that they catch insects in the pitchers, then secrete a fluid containing a peptic ferment by which the nitrogenous matters in the insects are actually digested, as such substances are digested in the

stomach of an animal, and then the digested matters are absorbed. The lower part of the pitcher is lined with beautiful digesting glands for this purpose. A similar digestion occurs in other "insectivorous plants," as in our common *Drosera* or Sun-dew.



LATTICE LEAF OF MADAGASCAR.

The Lattice Leaf of Madagascar, *Ouvirandra fenestralis*, is one of the most curious of all water plants. It grows in the swamps of Madagascar, in water which is seldom below 74 deg. Fahr. The spaces between the veins are open, the cellular tissue present in the leaves of other plants not being developed, hence its lace or lattice-like appearance. This plant is not

only curious, but valuable to the natives, who gather the fleshy rhizomes at certain seasons of the year, to be used when cooked as an article of food. Hence its native name Ouvirandrano, or "Yam of the Water."

The Sensitive Plant, *Mimosa pudica* (70), and Moving Plant, *Desmodium gyrans* (71), may be seen here during the summer months. The leaves of the latter are constantly in motion, rising up and falling down; and those of the former shrink from the touch.

Many Ferns and a few Palms are also cultivated here. Among the plants requiring special notice is the remarkable *Anthurium* belonging to the *Arum* family; the most conspicuous scarlet bracts of *Anthurium Scherzerianum*, and the rarer *A. Andreanum*, at once attracting the attention of the visitor.

A considerable portion of this house is occupied with exotic Ferns, the collection being a very fine one, and chiefly occupying the third compartment. Nothing can exceed the beauty and variety of the leaves or fronds of this tribe of plants. Some are covered underneath with a yellow powder like the richest gold dust, and others white like silver. Every imaginable form is perceptible among them, from the flat *Platycerium*, Stag's Horn

Fern, which covers the trunks of trees with its barren fronds in some parts of America, Australia, and Africa, whilst it pushes out fertile fronds like elk's horns in miniature;—to the beautiful *Adiantum*.

Among the most important genera here represented are *Adiantum*, *Asplenium*, *Polypodium*, *Pteris*, *Aspidium*, *Gymnogramme*, with gold and silver dust, *Davallia*, *Acrostichum*, *Platynerium*, and *Anemia*. Other ferns deserve special notice such as *Trichocarpa Moorei*, and *Fadyenia prolifera*. The remarkable climbing ferns, belonging to the genus *Lygodium*, are well represented, the elongated leaves look at first sight like a climbing stem. There is also in the house a fine collection of *Selaginellas* and several *Lycopods*, as well as the very remarkable *Psilotum triquetrum*.

THE GREAT PALM HOUSE, No. 7.

Leaving the Orchid and Fern House we pass into the Palm House. The plants here, with stately-looking fan and feather-formed leaves, are principally Palms, which are considered the most beautiful family of plants in the whole vegetable kingdom. It is also one of the most important to man, yielding him at once, as they do, food, drink, material for clothing, domestic utensils, and, in some instances, habitations. Among the plants here cultivated are the great Fan Palms, *Sabal umbraculifera*, *Sabal Blackburniana*, and the Mauritius Fan Palm, *Latania borbonica*.

Several species of *Areca*, the cabbage-bearing kinds of Palm, are conspicuous. The portion called cabbage is the large terminal bud, which is produced before the flowers shoot forth.

Areca Catechu, the Betel Nut Palm, the fruit of which is consumed in enormous quantities in India and China. It is chewed with lime and the leaves of a pepper (*Piper Betel*) to which may be due the intoxicating effect attributed to the *Betel-nut*, which is simply astringent.

Drymophloeus Zippelii and *Caryota urens* are remarkable for their curiously cut or torn-like leaves.

The wild Date, *Phoenix sylvestris* (72), from which sugar is obtained. *Arenga saccharifera*, which yields sago. This is also known as the Sugar Palm, and is a native of the Indian Archipelago. It

is a very important and useful palm. The pith of the stems yields sago, about 150 lbs. being obtained from one tree, and the hollow stems of dead trees furnish very durable underground water pipes. The black fibre formed by the sheathing parts of the leaves furnishes cordage of a very excellent kind and this cordage is noted for its powers of resisting wet. The trees are in blossom all the year round and the sheaths enclosing the flowers afford an abundance of saccharine juice, about three quarts daily from each tree. This juice is fermented to form palm wine or toddy, and Jaggery sugar of India is got by boiling the toddy.

The well-known Cocoa Nut, *Cocos nucifera* (73), is of vast importance to the inhabitants of many parts of the globe. It is the most celebrated and best known of all palms. *Cocos nucifera* is a native of the coasts of tropical Africa, India, Malay Archipelago, and of the islands of the Indian and Pacific Oceans. It is cultivated in all tropical countries. It thrives best near the sea, and requires no special attention. The tree is from 50 to 100 feet in height, and the so-called nuts are produced in bunches of from about ten to twenty together. The fruit consists of the hard shell or nut enclosed in a thick fibrous coat. The uses are said to be

as numerous as the days in the year, as the tree affords food, drink, domestic utensils, and material for building and thatching. In some countries the whole food of the natives consists of the white albumen of the nut, and the milk serves for drink. Wine and jaggery sugar are also obtained from the palm. Oil is expressed from the albumen and is used in making candles. The fibre or coir is used for ropes, and also for floor matting, brushes, brooms, &c. The hard shells make cups and other utensils and the



COCOA NUT PALM.

wood is known as Porcupine wood. *Elæis guineensis* is the species which principally yields the Palm Oil of commerce.

Pritchardia pacifica (74) of Polynesia, is a Palm which, throughout the Polynesian Islands, is held to be exclusively the property of the aristocracy, and is not allowed to be devoted to common purposes by the lower classes.



THE PLANTAIN TREE.

The Plantains (*Musa paradisiaca*, L.) and Bananas (*Musa sapientum*, L.) (75), which are conspicuous objects. The leaves of these plants are very large. Some of them have been grown in this garden to the length of ten feet, being fully four feet wide. They are even seen to better advantage in a cultivated state, when growing freely, than they are in their native habitats, where their thin broad blades are generally split into shreds by the wind.

Bananas and Plantains have long been used as an important article of human food, for which they are of inestimable value to the inhabitants of tropical countries. These large-leaved plants, which frequently may be seen bearing fruit in various stages of maturity, are only the growth of *two* years. The bunch, when ripe, may weigh from twenty to thirty pounds; they often weigh from sixty to seventy in their native countries. After the fruit is gathered, the plant is cut down to the ground, which can easily be effected with a common pocket knife, as the stem is quite soft, being composed of the remains of the foot-stalks of the leaves. Unless in the form of the fruit, the Banana does not differ in appearance from the Plantain, of which it is considered by most botanists to be merely a variety, although they were separated by Linnaeus as distinct species. From some of the species, particularly *Musa textilis*, a strong fibre is produced, of which cordage is made. The leaves are frequently used for covering huts, &c., as well as for some medicinal purposes, such as for dressing blisters. The fibre and prepared fruit may be seen in the Museum at the gate. Other species are cultivated, as

the dwarf *Musa chinensis* (*Cavendishii*) and the Abyssinian *Musa Ensete*. This latter does not produce an edible fruit, but the young body of the plant when boiled forms one of the best of vegetables. This species was discovered by Bruce, the Abyssinian traveller, and was introduced in 1853, by the late Mr. Plowden, when H. B. M. Consul at Massowah.

The Screw Pines or Buttress Trees, *Pandanus odoratissimus* (76), and *Pandanus utilis* (the former the "Vacoua" of the Malagasy), are here cultivated, but they are all at present comparatively small plants.

The Banyan Tree (*Ficus bengalensis*, L.) (77), is commonly planted for shade, and is one of the most remarkable trees in India. The branches give off aërial roots from all parts, and these descending into the soil form a perfect labyrinth of subsidiary stems and trunks supporting an enormous extent of foliage. There is on record a Banyan capable of affording shelter to 20,000 men. The seeds of the Banyan rarely germinate on the ground, but usually in the crown of a palm tree, where the seeds are deposited by birds. Roots are sent down to the ground, which soon kill the nurse-palm.

The Bamboo, *Bambusa vulgaris* (78), grows near the back of the house. This gigantic grass sends up shoots, which vary from thirty to forty feet in height, in one season. The species and its varieties are cultivated extensively in countries where the climate is favourable to their growth. It is used for a great many useful purposes, such as for making masts for boats, drinking cups, baskets, pailings, and even bridges are constructed of it in warm countries, where it grows sometimes to a height of 100 feet. The bamboo and the cocoa-nut palm are perhaps the two most useful plants in the whole world. Dr. A. Hunter thus describes the bamboo:—"There is probably no other plant that is put to so many and such opposite and diversified uses. The whole bamboo is used for a great variety of purposes according to its size; as for posts, props, poles of tents, tall frames for pigeons to light on, sign posts, poles for carrying water, luggage, palankeens or dhoolies, for floating rafts, for light scaffolding which can be erected quickly and run up to great heights, pecottahs over wells for raising water,

swinging poles at feasts, small light bullock-carts, larger travelling covered carts, raised watch houses for guarding crops, ladders and fire escapes, fishing rods, poles for pushing boats, spear shafts, chairs, walking sticks, bastinado rods, water-pipes, floats for lines and nets, blow-pipes and distillery tubes, hookah pipes, bows and arrows. The joints when cut into lengths are also used as bottles, ewers, pots, oil or sugar vessels, and for a very ingenious mode of decorating floors by pricking a pattern through the bamboo, filling the joint with powdered chalk, and tapping it gently while rolling along the floor, immediately after the latter has been wet with rice-water. The split bamboo is put to nearly as many uses as the whole."

Here also is a fine plant, *Astrapæa Wallichii*, which may at once be known by its large round leaves. Mr. Ellis states that a group of those trees in blossom is one of the most magnificent objects to be seen in Madagascar. The name, he considers, is derived from the word for lightning, on account of the brilliancy of the flowers, which hang in large pendant clusters from near the points of the branches.

Among the Palms requiring special notice are *Acrocomia aculeata*, *Cocos plumosus*, *Chamærops excelsa*, *Trinax parvifolia*, and the Coquito palm, *Jubæa spectabilis*, some of these being among the tallest specimens in the house.

A Palm may be seen here, which possesses a good deal of interest, the *Phytelephas macrocarpa* of New Grenada, the seeds of which constitute the vegetable ivory, so much used for turning into knobs for the ends of umbrella handles, &c. The young plants were raised from seeds sent by Judge O'Reilly, from Jamaica.

The Cycads are a small group of palm-like shrubs or trees, but closely allied to the pine-trees. They are mostly natives of Central-America, South Africa, Australia, and tropical Asia. None are now natives of Europe, but the fossil remains of Cycads are very abundant in the Mesozoic rocks of Britain and the Continent.

The beautiful *Cycas revoluta* is a plant belonging to the Cycadaceæ. This is the Sago plant of Japan, as there is procured from the pith or cellular substance that occupies the interior of the stem, a kind of Sago, which Thunberg tells us is held in high

estimation in that country, so much so that it was contrary to the laws of Japan to take the Sago plants out of it. A considerable portion of the Sago of commerce is furnished by another beautiful species, of which there is a fine plant in this house, *Cycas circinalis*.

The Arborescent Ferns are many of them only young plants, and have not yet formed much of stems. There is, however, one fine plant, *Cyathea serrata*, which affords a good idea of those strikingly beautiful plants. The stem of this species is already seventeen feet high. Another beautiful plant stands close to it, *Cyathea Schiedeana*, the fronds of which are ten feet long, *Cyathea medullaris*, *Hemitelia horrida*, *Amphicosmia Beyrichiana* and *Amphicosmia capensis* are all forming fine stems.

There are some large leaved plants which are worthy of notice, such as *Strelitzia augusta*, from South Africa; but particularly the plant which bears so great a resemblance to it, the Traveller's Tree of Madagascar, *Urania speciosa*. A portion of the leaves of this plant, where they overlap each other, holds water, which is always fresh, and when pierced with the point of a spear or other sharp instrument, the water gushes out, and supplies the thirsty traveller with a cooling drink.

Brownea grandiceps is one of the most splendid trees in Jamaica, and here annually produces large bunches of magnificent scarlet flowers.

Other plants requiring special notice are the remarkable tropical *Aroids* with their aerial roots, and some of them, as *Monstera*, have holes in the blade of the leaf.

THE CAMELLIA HOUSE, No. 8.

We now proceed to enter the last division of this range, No. 8, which is called the *Camellia House*, in consequence of its being chiefly occupied with species of *Camellia*, *Azalea*, and *Rhododendron*. February and March are the months to see it in perfection, when the camellias are mostly in bloom.

In this house are many fine specimens of the genus *Gleichenia*, a remarkable group of ferns at present almost limited to the southern flora of the globe. Here also are cultivated many

superbia
discolor
labellata

specimens of ferns from the temperate regions of the globe requiring a cool house. Here also may be seen in early autumn the magnificent *Disa grandiflora*, an orchid only met with on Table Mountain, at the Cape of Good Hope.

The white and scarlet flowered Tree Rhododendrons of Nepal, with various other species and hybrids of the same tribe, are generally to be found here. These magnificent plants attain sometimes to a height of thirty feet in their native country, and when a mass of them is in full bloom, the gorgeous effect they produce is, perhaps, unequalled by any other kind of plants. During the summer and autumn, when the camellias are taken out, the house is filled with a selection of the hardier sorts of Palms and other plants remarkable for their foliage, and a collection of flowering greenhouse plants.

ORNAMENTAL FLOWER GROUND.

We now leave the Conservatories, and proceed to look at some of the plants out of doors. Immediately in front there is a broad belt of ornamental ground laid out in beds on grass, interspersed with single specimens of rare and ornamental shrubs. During the summer months these beds are filled with different kinds of showy annuals and other half-hardy plants.

Among the plants in front of the range of Conservatories the following may be mentioned :—

Eugenia Ugni, from Patagonia, which yields a small delicious fruit, grows on the border in front, but it is cut down in severe winters by frost.

Arbutus hybrida, a shrub remarkable for the way in which the bark peels off its stems ; and *Morus rubra*, a mulberry, one of the oldest plants in the Garden.

A fine plant of the great Pampas Grass of South Brazil, *Gynerium argenteum*, which was first raised from seeds in this Garden, whence plants were sent to most of the other public gardens in Britain and elsewhere. Another large grass, *Arundo*

Donax, the gigantic reed of the South of Europe, grows opposite the dwelling-house.

The different kinds of *Yucca*, *Adam's Needles*, are conspicuous plants on various parts of the pleasure grounds.

On the middle of the walk leading to the Central Conservatory, stands a singular looking tree, the *Ailanthus glandulosus*, the branches of which bear some resemblance to the antlers of a stag. The leaves of this tree form the principal food of the hardy species of silk-worm (*Bombyx Yama-mai*) which was introduced some time ago into Britain.

ROCKERY.

The rockery forms part of the ornamental division. The plants cultivated here are principally such as grow among rocks in their native countries, or are suitable for cultivation on artificial rock-work. The rock-garden has been newly formed, as the erection of the new palm house necessitated the removal of the rockery which stood in front of the old palm house. (See G. on Map).

II. GENERAL ARRANGEMENT OF HARDY HERBACEOUS PLANTS.

This department of the Garden will be found to the south and west of the great Palm-house. (See D. on Map.)

The plants are here arranged in NATURAL ORDERS, or according to the NATURAL SYSTEM of classification, and as it is impossible to arrange the beds in proper sequence, as such a course would necessitate frequent change in the position of the beds, the label of each natural family has the number marked on it which the family bears in Bentham and Hooker's "Genera Plantarum."

The *Pteridophyta* or *Vascular Cryptogamic* plants, belonging to the classes *Filicinae*, *Equisetinæ*, and *Lycopodinæ* are also represented, and a list of the families of these classes is given below. A few of the *Bryophyta* belonging to the classes *Hepaticæ* and *Musci* are also cultivated.

The following is a list of the Natural Orders of flowering plants enumerated in Bentham and Hooker :—

- | | | |
|----------------------|----------------------|-----------------------|
| 1. Ranunculaceæ. | 66. Combretaceæ. | 184. Polygonaceæ. |
| 2. Dilleniaceæ. | 67. Myrtaceæ. | 185. Podostemaceæ. |
| 3. Calycanthaceæ. | 68. Melastomaceæ. | 186. Nepenthaceæ. |
| 4. Magnoliaceæ. | 69. Iythrariæ. | 187. Cytiaceæ. |
| 5. Anonaceæ. | 70. Onagraceæ. | 188. Aristolochiaceæ. |
| 6. Menispermaceæ. | 71. Samydaceæ. | 189. Piperaceæ. |
| 7. Berberidæ. | 72. Loasæ. | 190. Chloranthaceæ. |
| 8. Nymphaeaceæ. | 73. Turnerraceæ. | 191. Myristicæ. |
| 9. Sauraceniaceæ. | 74. Passifloreæ. | 192. Monimiaceæ. |
| 10. Papaveraceæ. | 75. Cucurbitaceæ. | 193. Laurinæ. |
| 10A. Fumariaceæ. | 76. Begoniaceæ. | 194. Proteaceæ. |
| 11. Crucifereæ. | 77. Datisceæ. | 195. Thymelæaceæ. |
| 12. Capparidæ. | 78. Cactæ. | 196. Penæaceæ. |
| 13. Rosedaceæ. | 79. Ficoidæ. | 197. Elæagnaceæ. |
| 14. Cistineæ. | 80. Umbellifereæ. | 198. Loranthaceæ. |
| 15. Violariæ. | 81. Araliaceæ. | 199. Santalaceæ. |
| 16. Canellaceæ. | 82. Cornaceæ. | 200. Balanophoreæ. |
| 17. Bixineæ. | 83. Caprifoliaceæ. | 201. Euphorbiaceæ. |
| 18. Pittosporæ. | 84. Rubiaceæ. | 202. Balanopæceæ. |
| 19. Tremandrea. | 85. Valerianæ. | 203. Urticaceæ. |
| 20. Polygalæ. | 86. Dipsacæ. | 204. Platanaceæ. |
| 20A. Vochysiaceæ. | 87. Calycereæ. | 205. Leitneriæ. |
| 21. Frankeniaceæ. | 88. Compositæ. | 206. Juglandæ. |
| 22. Caryophylleæ. | 89. Stylidiæ. | 207. Myricaceæ. |
| 23. Portulacæ. | 90. Goodenoviæ. | 208. Casuarinæ. |
| 24. Tamariscinæ. | 91. Campanulaceæ. | 209. Cupulifereæ. |
| 25. Elatineæ. | 92. Vacciniaceæ. | 210. Salicinæ. |
| 26. Hypericineæ. | 93. Ericaceæ. | 211. Lacistemaceæ. |
| 27. Guttifereæ. | 94. Monotropæ. | 212. Empetraceæ. |
| 28. Ternstroemiaceæ. | 95. Epacridæ. | 213. Ceratophylleæ. |
| 29. Dipterocarpeæ. | 96. Diapensiaceæ. | 214. Gnetaceæ. |
| 30. Chlenaceæ. | 97. Lennoaceæ. | 215. Conifereæ. |
| 31. Malvaceæ. | 98. Plumbaginæ. | 216. Cycadaceæ. |
| 32. Sterculiaceæ. | 99. Primulaceæ. | 217. Hydrocharidæ. |
| 33. Tiliaceæ. | 100. Myrsinæ. | 218. Burmanniaceæ. |
| 34. Linææ. | 101. Sapotaceæ. | 219. Orchidæ. |
| 35. Humiriaceæ. | 102. Ebenaceæ. | 220. Scitamineæ. |
| 36. Malpighiaceæ. | 103. Styraceæ. | 221. Bromeliaceæ. |
| 37. Zygophylleæ. | 104. Oleaceæ. | 222. Hamodoraceæ. |
| 38. Geraniaceæ. | 105. Salvadoraceæ. | 223. Iridæ. |
| 39. Rutaceæ. | 106. Apocynaceæ. | 224. Amaryllidæ. |
| 40. Simarubæ. | 107. Asclepiadæ. | 225. Taccaceæ. |
| 41. Ochnaceæ. | 108. Loganaceæ. | 226. Dioscoreaceæ. |
| 42. Burseraceæ. | 109. Gentianeæ. | 227. Roxburghiaceæ. |
| 43. Meliaceæ. | 110. Polemoniaceæ. | 228. Liliaceæ. |
| 44. Chailletiacæ. | 111. Hydrophyllaceæ. | 229. Pontederiaceæ. |
| 45. Olacineæ. | 112. Boraginæ. | 230. Philodracæ. |
| 46. Illiciæ. | 113. Convolvulaceæ. | 231. Xyridæ. |
| 46A. Cyrtillæ. | 114. Solanaceæ. | 232. Mayaceæ. |
| 47. Celastrineæ. | 115. Scrophularinæ. | 233. Commelinaceæ. |
| 48. Stackhousiæ. | 116. Orobanchaceæ. | 234. Rapateaceæ. |
| 49. Rhamnæ. | 117. Lentibulariæ. | 235. Flagellaræ. |
| 50. Ampelidæ. | 118. Columelliaceæ. | 236. Juncaceæ. |
| 51. Sapindaceæ. | 119. Gesneraceæ. | 237. Palma. |
| 52. Sabiaceæ. | 120. Bignoniaceæ. | 238. Pandanaceæ. |
| 53. Anacardiaceæ. | 121. Pedalinæ. | 239. Cyclanthaceæ. |
| 54. Coriariæ. | 122. Acanthaceæ. | 240. Typhaceæ. |
| 55. Moringæ. | 123. Myoporinæ. | 241. Aroidæ. |
| 56. Connaraceæ. | 124. Selaginæ. | 242. Lemnaceæ. |
| 57. Leguminosæ. | 125. Verbenaceæ. | 243. Triuridæ. |
| 58. Rosaceæ. | 126. Labiatæ. | 244. Alismaceæ. |
| 59. Saxifragæ. | 127. Plantaginæ. | 245. Naidaceæ. |
| 60. Crassulaceæ. | 128. Nyctaginæ. | 246. Eriocaulæ. |
| 61. Droseraceæ. | 129. Illecebraceæ. | 247. Centrolepidæ. |
| 62. Hamamelidæ. | 130. Amarantaceæ. | 248. Restiaceæ. |
| 63. Bruniaceæ. | 131. Chenopodiaceæ. | 249. Cyperaceæ. |
| 64. Haloragæ. | 132. Phytolacpæceæ. | 250. Graminæ. |
| 65. Rhizophoreæ. | 133. Batidæ. | |

Pteridophyta or Vascular Cryptogams.

I. Filicinae.

1. Hymenophyllaceæ.
2. Cyatheaceæ.
3. Polypodiaceæ.
4. Gleicheniaceæ.
5. Osmundaceæ.
6. Schizaceæ.
7. Salvinaceæ.
8. Marsileaceæ.

9. Marattiaceæ.

10. Ophioglossaceæ.

II. Equisetineæ.

1. Equisetaceæ.

III. Lycopodinae.

1. Lycopodiaceæ.
2. Psilotaceæ.
3. Selaginellaceæ.
4. Isoetaceæ.

ARRANGEMENTS OF BRITISH PLANTS.

On the opposite side of the walk, and forming a continuation of the same semicircle, the plants which are indigenous to Great Britain and Ireland are placed. The different natural orders are contained in separate beds formed on the grass, with their names respectively placed at the end of each bed. (See Map E.)

The arrangement followed is that of Sir Joseph Hooker's "Student's Flora," and each of the natural families bears a number corresponding to that in the "Student's Flora." It is to be noticed that the beds containing the different families are not arranged in sequence.

1. Ranunculaceæ.
2. Berberidaceæ.
3. Nymphaeaceæ.
4. Papaveraceæ.
5. Fumariaceæ.
6. Cruciferae.
7. Resedaceæ.
8. Cistaceæ.
9. Violaceæ.
10. Polygalaceæ.
11. Frankeniaceæ.
12. Caryophyllaceæ.
13. Portulacaceæ.
14. Paronychiaceæ.
- 14†. Tamariscinaceæ.
15. Elatinaceæ.
16. Hypericaceæ.
17. Malvaceæ.
18. Tiliaceæ.
19. Linaceæ.
20. Geraniaceæ.
21. Iridaceæ.
22. Empetraceæ.
23. Celastrinaceæ.
24. Rhamnaceæ.
25. Sapindaceæ, Tribe
Acerinaceæ.
26. Leguminosæ.
27. Rosaceæ.
28. Saxifragaceæ.
29. Crassulaceæ.
30. Droseraceæ.
31. Haloragaceæ.
32. Onagraceæ.

33. Lythraceæ.
34. Cucurbitaceæ.
35. Umbelliferae.
36. Araliaceæ.
37. Cornaceæ.
38. Caprifoliaceæ.
39. Rubiaceæ, Tribe
Stellateæ.
40. Valerianaceæ.
41. Dipsacaceæ.
42. Compositæ.
43. Campanulaceæ.
44. Ericaceæ.
45. Oleinaceæ.
46. Apocynaceæ.
47. Gentianaceæ.
48. Polemoniaceæ.
49. Convolvulaceæ.
50. Boraginaceæ.
51. Solanaceæ.
52. Plantaginaceæ.
53. Scrophularinaceæ.
54. Orobanchaceæ.
55. Labiateæ.
56. Verbenaceæ.
57. Lentibularinaceæ.
58. Primulaceæ.
59. Plumbaginaceæ.
60. Polygonaceæ.
61. Chenopodiaceæ.
62. Thymeleæ.
63. Elæagnaceæ.
64. Loranthaceæ.
65. Santalaceæ.

66. Aristolochiaceæ.
67. Euphorbiaceæ.
68. Ceratophylleæ.
69. Urticaceæ.
70. Cannabinaceæ.
71. Ulmaceæ.
72. Salicaceæ.
73. Cupuliferae.
74. Betulaceæ.
75. Myrtaceæ.
76. Coniferae.

1. Hydrocharidaceæ.
2. Orchidaceæ.
3. Iridaceæ.
4. Amaryllidaceæ.
5. Dioscoreaceæ.
6. Alismaceæ.
7. Naiadaceæ.
8. Liliaceæ.
9. Juncaceæ.
10. Aroidaceæ.
11. Lemnaceæ.
12. Typhaceæ.
13. Eriocaulonaceæ.
14. Cyperaceæ.
15. Graminaceæ.

1. Filices.
2. Equisetaceæ.
3. Lycopodiaceæ.
4. Selaginaceæ.
5. Marsilaceæ.

MEDICINAL PLANTS.

Next to the native plants, the arrangement of hardy *medicinal* plants is placed, and contains such as are included in the British Pharmacopœia, and will grow in the open air. This division may be readily distinguished by the plants being planted in parallel beds, subdivided into natural families. (See Map F.)

III.—THE ARBORETUM AND FRUTICETUM.

Leaving the departments we have now gone over, the tree and shrub divisions will afford interest, especially to those who contemplate planting, and wish to observe somewhat of the effect produced by the different species when seen grouped together. This department is situated next the arrangements of herbaceous plants, and in some places extends to the outside boundaries of the Garden. The specimens were originally planted to illustrate the artificial system of classification of Linnæus. The series which cannot now be modified begins at the end of the walk near the Entrance Gate, and continues to occupy the right and left hand sides of this spacious walk, nearly to the chain tent near the lake. (See Map N.)

Among the first shrubs met with are *Olea neapolitana* and species of *Osmanthus*, *Ligustrum*, *Phillyrea*, *Jasminum*, and *Syringa*. Among the *Ilex*, or Holly group, there are some fine plants, particularly the Madeira Holly, *Ilex Perado*. Among the Elms on the left there are specimens of most of the kinds which are now planted, as well as a fine tree of *Planera Richardi*. Among the species of *Rhus* is the Poison Oak of North America, *Rhus Toxicodendron*; and a little further on is *Rhamnus hybridus*, which is one of the best evergreen shrubs we have, and seldom seen good out of Ireland. Here also are planted examples of *Sambucus*, *Viburnum*, *Euonymus*, *Weigelia*, *Ribes*, *Lonicera*, *Vitis*, *Hedera*, and *Symphoria*.

The small beds to the left, on the grass, contain some good specimens of Hardy Heaths and Barberry trees, as well as *Escallonia*, *Laurus*, and a few examples of *Rhododendron*. Here also are examples of the genera *Æsculus* and *Pavia*.

In the next division are examples of the original species from which most of our different kinds of fruit trees originated, including the Almond, Peach, Apricot; also a remarkable variety of the common Thorn, called the Glastonbury Thorn, which in mild winters produces its flowers about Christmas. There are also numerous fine specimens of *Mespilus*, *Crataegus*, *Pyrus*, and *Prunus*, as well as a large bed chiefly devoted to *Spiræa*.

Near this, enclosed within a semi-circular hedge, a number of the more distinct species of Roses are cultivated in beds.

There is a specimen of the Umbrella Tree of North America, *Magnolia umbrellæ*, in the group of trees and shrubs between the rose garden and central walk, and a collection of species of *Clematis*, *Helianthemum*, *Cistus*, and examples of *Liquidambar*, *Tilia*, and the curious *Azara microphylla*. Among the Pea-flowered shrubs, which form the first group on the opposite side of the walk, there is a singular hybrid plant between the common Laburnum and *Cytisus purpureus*, known as *Cytisus Adami*. The singularity of this plant consists in its producing the flowers of both parents in distinct bunches, and even on different branches, as well as the flowers mixed (i.e., intermediate, partaking of both) on other branches, all at the same time and on the same tree. Near this is a bed of brambles, in which several species of *Rubus* are cultivated, and there are also specimens of *Catalpa* and a bed devoted to *Hypericum*.

Standing singly on the grass, at a little distance from this, is a large plant of the North American Birthwort, *Aristolochia Sipho*, which, with its large, round, broad leaves, forms a very conspicuous object.

At this point, the Pine tribe begins on one side of the walk, and the Oaks, Birches, &c., on the other. Among the latter is the Paper Birch of North America, *Betula papyracea*, from the bark of which the Indians form canoes. The Cork Tree, *Quercus suber*, is one of the group of evergreen Oaks; while other genera, as *Castanea*, *Carya*, *Morus* and *Juglans* find their place here. There is also a good specimen of the Chinese Maiden Hair-leaved Tree, *Ginkgo biloba*.

The Pine group affords a few good old specimens, along with

the more recently introduced kinds, from the north-west coast of America, Mexico, and Nepal. A fine thriving plant of the Cedar of Lebanon, *Cedrus Libani*, is among the former, and two very fine specimens of Pallas's Pine, *Pinus Pallasiana*, as well as a *Pinus Laricio*.

There are also examples of such genera as *Platanus*, *Corylus* and *Fagus*.

The walk leading to the new arboretum ground are planted with Yews, among which is a fine example of the Golden Yew, and on the right, covering a great extent of ground, is a fine collection of coniferous trees. *Abies nobilis* is above twenty feet high, and has already borne cones several times. Among the Pines are *Pinus ponderosa*, *P. insignis*, *P. apulcensis*, *P. Montezumae*, *P. Sabineana*, *P. Coulteri*, *P. excelsa*, *P. Gerardiana*, *P. Jeffreyi*, *P. tuberculata*, and many others. Some of these are pretty good plants, while along with them are small plants of most of the hardy species recently introduced. Many of these, with the Deodar, from Nepal, and others from different parts of the northern hemisphere of the globe, will, no doubt, form a grand feature in this country some fifty years hence.

The beautiful group of Cypress Trees, *Cupressus* and *Thuja*, are here, and a little further on is the Juniper group. *Sequoia sempervirens* is also making a fine plant. It has already attained to a height of nearly thirty feet, and is growing rapidly. This is one of the finest trees which has yet been found in California for ornamental purposes, and is known as Californian Red Wood. This is a close ally of the Mammoth tree of California, the *Wellingtonia* or *Sequoia gigantea*, of which there are some good specimens in the Garden, the best being that in front of the Curator's House.

The Acer tribe, on the left-hand side of the walk, furnishes the Sugar Maple of North America, *Acer saccharinum*. The sugar is obtained by tapping the trees, which causes the sap to flow freely, so much so that a single tree will yield as much as from two to three gallons in twenty-four hours. A tree will yield from two to four pounds of sugar yearly, and will continue to do so annually for forty years without injury.

Among the Ash group on the right are the ordinary and the flowering Ash.

The Fig Tree, Honey Locust Trees, *Gleditschia*, and some others of interest, should occupy places here, but the situation is too exposed (being the most elevated point in the Garden) for them, besides, the soil is very shallow, not being more than eight inches deep, when the limestone gravel is reached—circumstances which are unfavourable for their growth, consequently they are planted elsewhere.

The new ground is now being laid out as a continuation of the Arboretum, and already several groups have been planted.

LAKE OR AQUARIUM:

Entering the walk, the first object which is likely to attract attention, is a circle formed by rustic pillars, covered with Ivy, surrounding a Weeping Ash, which is grafted on a very high stem. This is called the Chain Tent. But by far the most interesting and truly natural looking object is the beautiful winding sheet of water (Map J.), which is covered with Water Lilies during the summer months. The water is supplied from the river Tolka, which forms the boundary to the Botanic Garden on the north side. (Map K.)

Various kinds of aquatic plants, along with the white and yellow Water Lilies, grow along the margin of this little lake; one of the most beautiful is a mass of our common Bogbean, *Menyanthes trifoliata*, which is at the upper end, near the Chain Tent. This charming plant, with its delicately coloured rosy and white fringed flowers, may truly be said to vie in beauty with our finest exotics. The Fresh-water Soldier, *Stratiotes aloides*, which is so unlike the generality of water plants, usually grows under the little bridge which crosses near the centre of the Aquarium, in company with the Water Violet, *Hottonia palustris*. The Frogbit, *Hydrocharis morsus-ranæ*, and the Bladder-wort, *Utricularia vulgaris*, may be specially mentioned. The *Utricularia* has peculiar bladders on the stems, which are traps to catch water-fleas, the plant being carnivorous like *Pinguicula* and *Drosera* growing near at hand.

Fine groups of the different species of Cat's Tail, *Typha latifolia*, *T. angustifolia*, and *T. minor*, may be seen at the lower end of the Aquarium. The ground on both sides of the water is occupied with various kinds of ornamental trees and shrubs, among which a fine tree of the copper-coloured Beech makes a conspicuous appearance. On a little island near the latter may be seen a group of a small kind of hardy bamboo, *Arundinaria falcata*, which was sent from the Himalayas. In the county Cork, where the climate is more favourable for the growth of this plant, it has already attained to a height of more than twenty feet, and is one of the most remarkable-looking hardy monocotyledonous plants hitherto introduced. In the enclosed piece of "bog" at the side of the pond are many interesting plants, as Orchids, *Pinguicula*, *Sarracenia*, &c. There are a number of formed beds containing Rhododendrons, Azaleas, and other plants which grow in peaty soil; they are very ornamental when in flower in May.

The SALICETUM, or WILLOW GARDEN, occupies the low-lying piece of marshy ground, on the opposite side of the stream, by the side of the boundary walk. (Map L.)

The collection of Willows is good, and cultivated for the purpose of supplying cuttings of the different kinds to persons who may apply for them, as well as for showing examples of the species to those interested in this valuable tribe of economical plants.

Continuing to follow this walk to the right, we pass through two parallel massive lines of Yew-trees, between which a walk is formed, called "Addison's walk," which was said to have been the favourite walk of this great essayist when he was Secretary to the Marquis of Wharton in 1714, and when the ground which is now the Botanic Gardens was the private demesne of his friend, Tickell, the author of "Colin and Lucy," &c. (Map H.)

The Yew-trees afford shelter to a few rare shrubs, which are planted on the south side of them—*Forsythia viridissima*, *Photinia serrulata*, *Colletia serratifolia*, *Garrya elliptica*, &c.

A good specimen of the scarlet-flowered Horse Chestnut stands where the walks meet near this spot; and near it is the *Mistletoe*, *Viscum album*, a plant which is not a native of Ireland. The

berries from which this plant, along with others that are growing in different parts of the Garden, were raised, were presented by Archbishop Whately in the year 1844.

A continuation of this walk towards the boundary wall, leads us to

IV. THE EXPERIMENTAL OR HORTICULTURAL AND AGRICULTURAL DIVISIONS.

This portion of the Garden is principally devoted to the cultivation of selections of the more important plants used for agricultural purposes, and for growing small quantities of as many varieties of the different vegetables used for culinary purposes as can be conveniently procured.

Experiments with different kinds of manures on various crops have also been tried here. The fruit tree quarter is occupied with a small selection of hardy fruit trees, including Pears, Apples, Plums, and Cherries.

The ground on the south is chiefly occupied with specimens of agricultural plants. They are cultivated for the purpose of showing examples of them to persons who are unacquainted with their appearance, though familiar with their names and uses, and also to show their produce on *one* kind of soil.

Next to them is the general collection of exotic Grasses which are arranged in natural sections. The ground is much too dry for them, as their stunted appearance shows. The consequence of this is, that several kinds which dislike much drought, cannot be grown here.

The kinds of grasses best suited for agriculture are separated from the general collection, and cultivated in compartments, next the boundary walk. Between the two, a portion of ground is devoted to the hardy plants used in arts and manufactures, commencing with those useful for their fibre, followed by those useful for producing oil, and those which produce dyeing material. Each section is marked by a board, which will enable the visitor to see at once what they are, besides, the plants are separately labelled.

The remaining portion of this ground is occupied with the culinary plants. This useful part of the Garden is terminated with a selection of the different kinds of Pot-herbs.

We have thus gone over the different departments as concisely as possible, and with as much regularity as the nature of the ground will admit of. The visitor will here find himself on the walk which leads to the Entrance Gate, near to which there is a good plant of *Paulownia imperialis* from Japan, with large spreading leaves.

And now, at the termination of our walk, the careful observer may, perhaps, have perceived that the extent and natural beauty of the ground, along with the various objects embraced, are such as not to be found combined in any other Botanic Garden in Europe.

BOTANICAL MUSEUM.

After the inspection of the Garden the visitor may examine the BOTANICAL MUSEUM, close by the Entrance Gate. (Map (J.)) This department we regret to say, is yet in a very unsatisfactory state. For although a great many valuable articles have been got together, want of room, and proper cases have prevented any scientific arrangement of them being made. The iron house, which is temporarily used for this purpose, is unsuited in many ways, or rather in every way, but it has enabled a beginning to be effected; and it is to be hoped, when the great utility of this department as a means for enlarging our ideas and extending our knowledge of the vegetable economy becomes more manifest, proper accommodation will be afforded.

We can only here notice a few of the more interesting articles in a general way. Among the products of Palms will be found the large spathes of the Troolie Palm from Demerara, which the Huron Indians use for helmets; sail of a boat made from the Ita Palm, *Mauritia flexuosa*; Spear for spearing fish, from footstalk of leaf of the Palm; Fibre and Cordage from *Astrocaryum aculeatum*; Fruit of Oil Palm, *Elæis guineensis*; Ivory Palm,

Phytalephas macrocarpa ; Rattan, *Calamus Rotang* ; Double Cocoa Nut, from the Seychelles Islands ; Betel Nuts, *Areca Catechu* ; sections of the stem of Cocoa Nut Tree, and of *Attalea compta* ; also a Palm stem fossilized.

Among Preserved Fruits there are Bananas, Plantains, the Bread Fruit, *Artocarpus incisa*, Yams, and Sweet Potato roots, also roots of the Cassava Plant, *Manihot utilissima* ; Baked Cake of same, as well as Meal and Starch ; Casareep Pepper Pot, and Bottle of Casareep ; a fine series of the different states of Chocolate, which were presented by S. Fry and Sons of Bristol ; Coffee, Tea, and Sugar in different states of preparation ; Rice, Indian Corn, and various kinds of Pulse grains.

Among fibres, a good series of Jute, *Corchorus capsularis*, which were presented by the Messrs. Malcolm, of the Chapel Shade Mills, Dundee, including both fibre and samples of cloth ; Plantain fibre ; Manilla Hemp ; Bambop fibre ; Chinese Grass fibre, *Urtica nivea* ; Fibres from different kinds of Agaves, Aloes, and Bromeliaceous plants ; a beautiful Chemisette, made from the fibre of Pine Apple Plant, which was presented by Mrs. Harkness.

Of the inner barks of trees, there are good examples of the Lace Bark of Jamaica ; a beautiful garment worn by the females of the Feejee Islands, made from the inner bark of the Paper Mulberry, *Broussonetia papyrifera*, and one worn by the males in the island of New Caledonia, made from the bark of the Bread Fruit Tree, *Artocarpus incisa* ; Halters for horses, made of Bonace Bark, *Daphne tinifolia*, of Jamaica, the latter presented by the Hon. Mr. Marsh ; samples of Chinese paper, made from various substances, presented by Surgeon Thornton.

A fine collection of Cones of coniferous plants, including nearly all which have not yet been introduced to Britain. Also cones of Cycadaceous plants, *Encephalartos pungens*, and *E. horrida* ; Vanilla pods, and fruit of Cochineal plants, the latter presented by Robert Mallet, Esq. ; a fine preparation of Nutmegs, presented by Judge O'Reilly ; among the seed vessels a large lomentum of *Entada gigalobium*, presented by Lieutenant Ashley La Touche.

A fine ball of Opium, presented along with many other valuable donations by the Honorable the East India Company.

An Indian Canoe made from a sheet of bark stripped in its rough state from a tree.

Collection of Barks in their rough state, which are used for medicine and for dyeing. Fine series of Tobaccos, presented by the Messrs. Clagget, London. A splendid collection of sections of foreign woods, including Sandal Wood, Log Wood, Rose Wood, Ebony Wood, &c., &c. The most valuable donations in this section have been made by Judge O'Reilly, and the Honorable Mr. Marsh, of Jamaica. Among stems are those of a Tree Fern, from Rio Janeiro, nearly thirty feet long, and some splendid Bamboos. Sections of grafted trees, showing the internal effects of grafting. Sections of Crab Apple Tree, with Mistletoe on it, showing the effects of the parasite on the plant it takes its nourishment from.

One of the most interesting specimens in the Museum is the plant of *Welwitschia mirabilis*, from W. Africa, a plant belonging to the singular group of the *Gnetaceæ*, a family closely allied to the Pines and Cycads.

Lastly, there is a Herbarium and Library. The former, which is open to the public for consultation, is particularly rich in Irish Cryptogamic plants. (Map A.)

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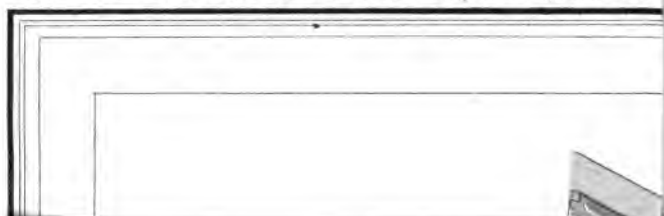
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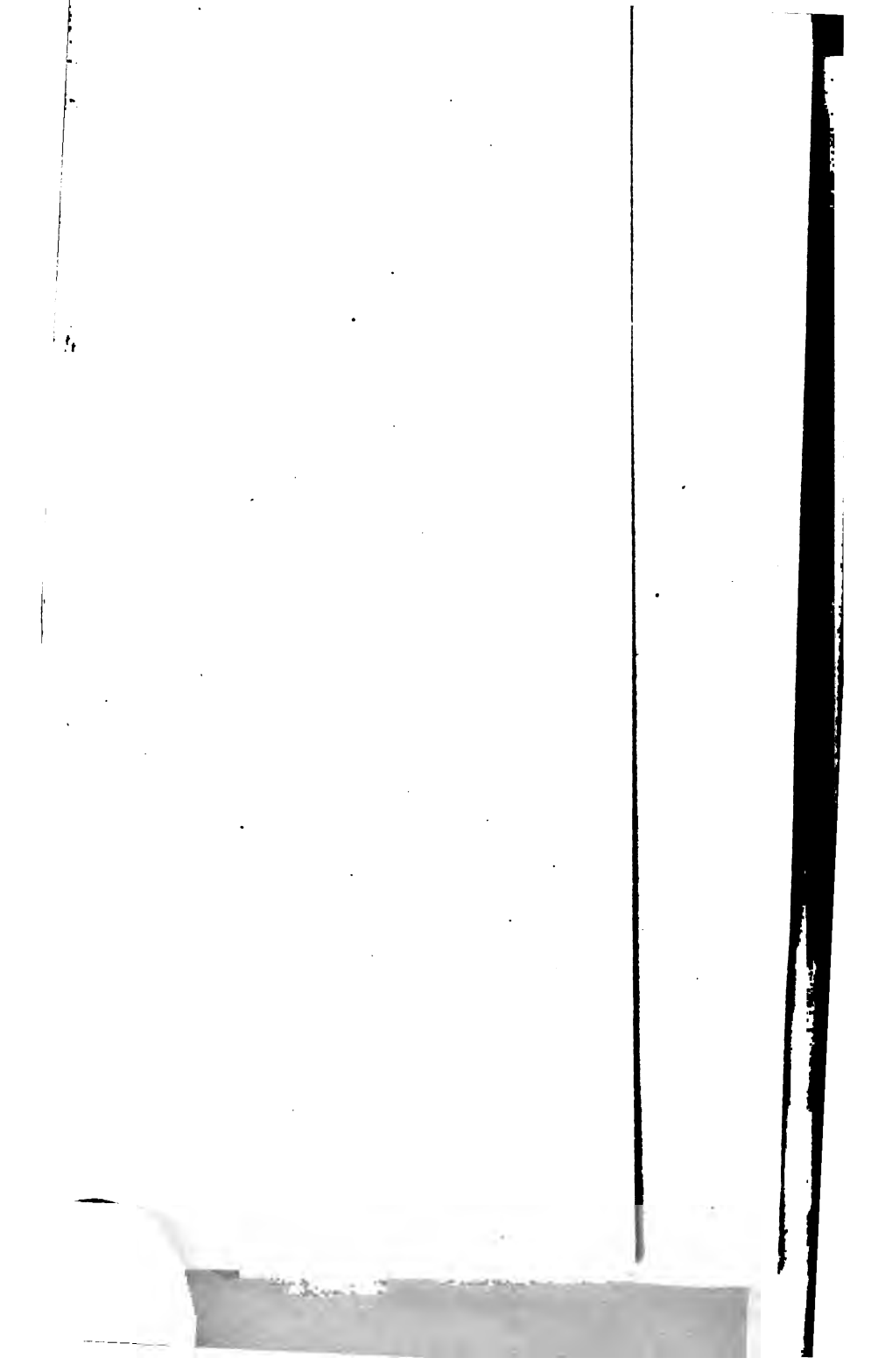
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DUBLIN: Printed by **ALEX. THOM & Co. (Limited)**, 87, 88, & 89, Abbey-street,
The Queen's Printing Office.
For Her Majesty's Stationery Office.

P. 26 1000. 4/85.

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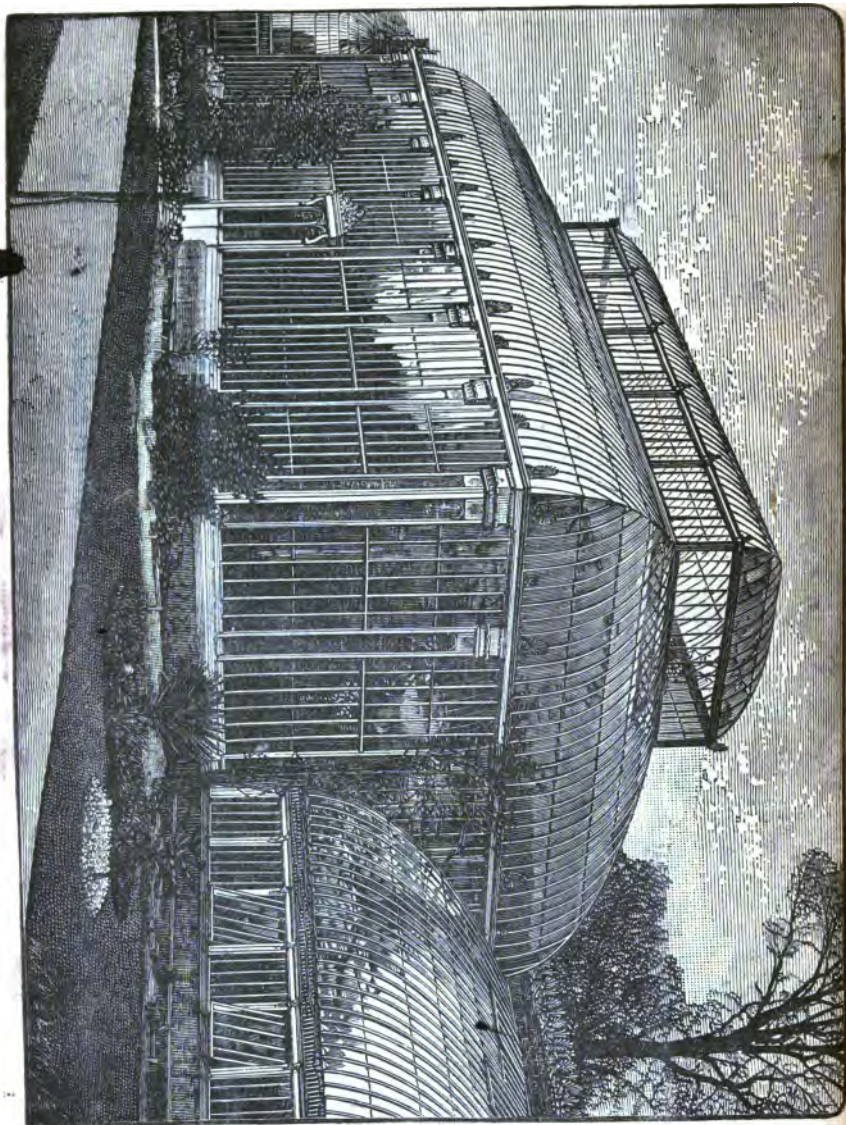
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